

Basic Computing

The TRS-80 User Journal

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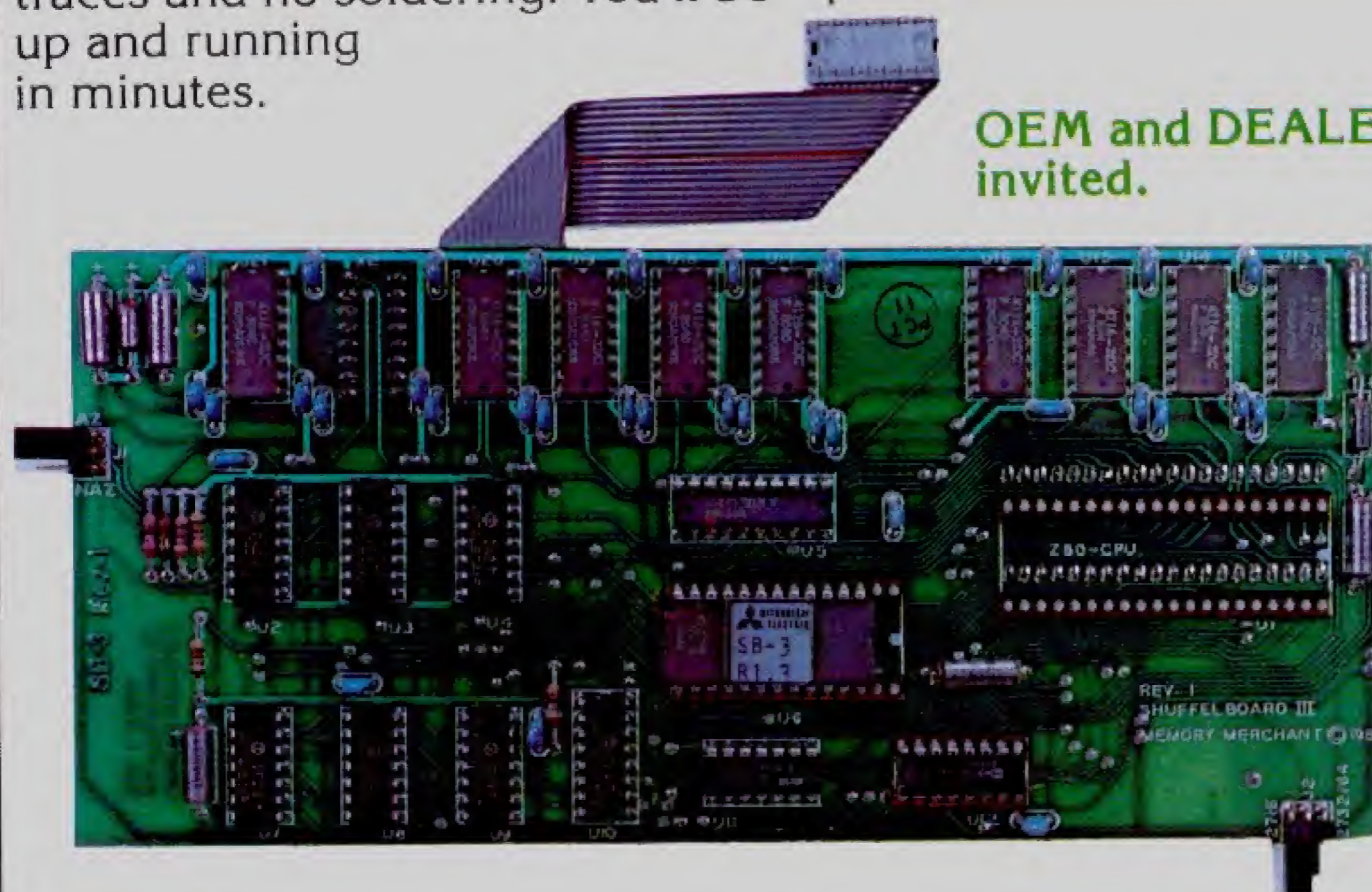
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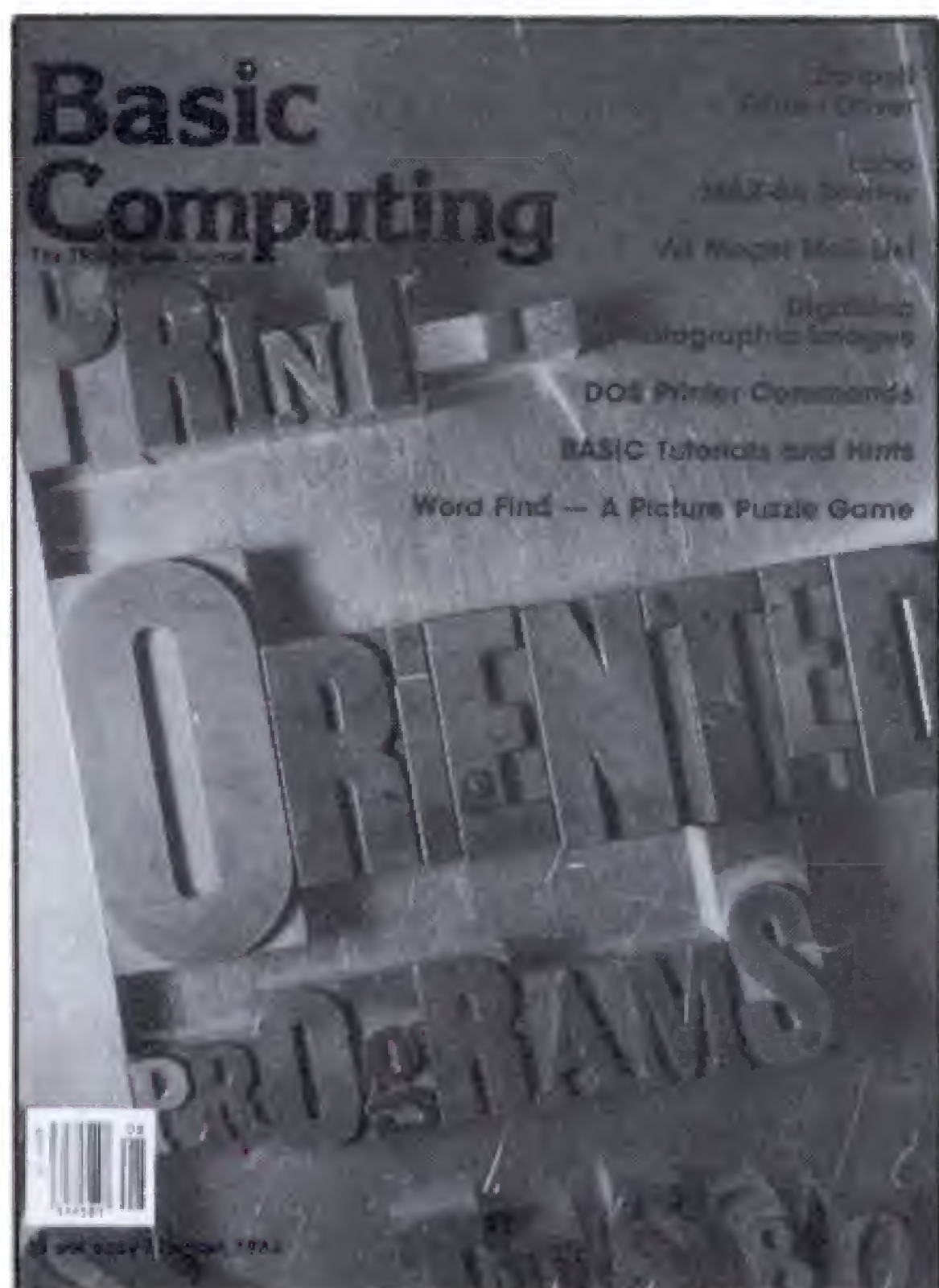
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Our cover was created with antique wood type blocks on a brass type tray. The type blocks and tray are from the collection of Cathy Doud, photographed by Frederick A. Johnsen of Tacoma, WA.

Basic Computing

The TRS-80 User Journal

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Vol. VI, No. 8 — August, 1983

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Editorial

By Cameron C. Brown

A flyer just crossed my desk that advertised a two-day seminar on using VisiCalc and a three-day one on programming in BASIC. Both subjects are commendable and worthy topics. The VisiCalc seminar costs \$395 and the other is only \$545 per participant. Come on . . . this is getting out of hand.

Granted, the seminar leaders have an excellent reputation and give superb presentations. The location is one of the finest sites that the Pacific Northwest has to offer. I thought, "Okay, maybe they plan to go into very exotic material."

Still, at those prices I was sure that no one would sign up to take them. Wrong. Two weeks before the classes began, there were 15 students in each, and every indication was that it would sell out.

According to the mailer, you go from learning about the components of a computer system to running and correcting a program. Insights are given to the LET, END, and PRINT commands, some READ, some DATA and a GO TO. After that, you get to hear about how to write and debug a program. (I am surprised they don't immediately go into how to market and package it for sale or, possibly, how to be a computer consultant.)

The class continues into data base concepts, setting up and accessing sequential files and even two-dimensional arrays. (All this for a novice?) That is amazing. In over ten years of teaching programming I never imagined that it was all so easy to learn (or lucrative). The class also discusses applications such as VisiCalc and how to use it, word processing software, data base programs and over six different application areas for use of a personal computer.

Once, I considered taking a job teaching the basics of computer use and programming to the

salesmen of a minicomputer company. To get a feel for their background, I took their two-day orientation class. A video tape presentation taught me the twenty-two jargon words needed for success. Liberally sprinkle your conversation with them and the buyer will be convinced, confused, and impressed. At that point the customer should be putty in your hands. I was shown each competing brand and carefully coached as to its failings in comparison to "ours." I was even able to run some software for a few hours (it was an inventory program). Class was over and I was ready to sell those \$45,000 systems.

I did not take the job and hoped that such days were coming to a close. But, combine the opportunity to make some big money, a huge, uninformed, and hungry audience, lots of media hype and high-priced seminars have an excellent chance for success. I am sure that each participant leaves feeling that he more than got his money's worth. The promoters are to be congratulated for seeing a need, setting up a program, and delivering a timely product. Personally, I am looking forward to the time when the number of suppliers of the knowledge meets the demand for it. Right now, high schools, community colleges, universities, libraries and even some user groups are low-cost alternatives. Even your Radio Shack store offers courses for a minimal fee. You could even buy every back issue that we have for only \$108.

Before I leave, here is something for the new VisiCalc user: Turn on your computer, slide the VisiCalc diskette into the disk drive and hit the reset button. Answer the date question and from TRSDOS Ready type the letters VC. This will load the VisiCalc program for you to use. Class is over. That will be \$27.50 please. You're welcome.

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The TRS-80 User Journal

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Letters to the editor

By Cameron C. Brown

The Datagraph program, reviewed by Mr. Bowman in the June issue, surpassed my expectations in its ease of use and in the quality of the high resolution graphs it produces on my Model III, LP VIII business system. Its autoscaling, axis labeling, error trapping and customized format features are delightful. As Mr. Bowman said, the graphs are quite attractive. He also described the manual provided by Micro Software Systems as "very unfriendly." To the contrary, I find its liberal use of illustrations, graphs and examples most helpful. I want to recommend the documentation to all programmers as an example of excellence to be imitated. The explanations are detailed and comprehensive, instructions effectively leading the user in a logical, step-by-step understanding of the many features of the program. Thank you for bringing this fine program and manual to my attention.

Don Cram
Los Angeles, CA

Mr. Bowman's reply: I stand by my comments and I would seriously question how the first-time user could successfully run the program, based upon the manual alone.

I have a Color Computer version of my Guitar Seminar program which ran in the July, 1983 issue. Any reader desiring the program may obtain it from me on tape for a donation.

The color version requires 16K Color BASIC and documentation is the same as for the Model I. I've also included a one-sheet programming guide on how to make use of Extended Color BASIC's PLAY command. I would also like to hear from anyone who has written tutorial-type programs like Guitar Seminar for other musical

instruments.

Lynard Barnes
320 So. Whipple St.
Chicago, IL 60612

Two improvements to my Smith-Corona TP-1 printer have been very valuable. First, I purchased a driver for this printer from ALPS, one of your advertisers. This does a super job of matching it up with my Model III.

The second item was the installation of a thermostat so that the fan doesn't run all the time. The noise from this fan can be irritating and most of the time it is unnecessary. I obtained this low-priced thermostat from THERM-O-DISC, Inc., P.O. Box 689, Aiken, SC 29801, on the recommendation of Smith-Corona. The type number is 36T22 (X-73134R). Installation was easy, but I would contact Smith-Corona for details as to where to locate it, etc. These two alterations have made this inexpensive system an excellent (and quiet) word processor.

Al Hurst, CLU
Tacoma, WA

I bought a copy of your magazine recently and liked very much what I saw. Of particular interest was the article Moving Day for DEBUG, by Don Bazzurro, April, 1983. I, too, had found DEBUG's usefulness somewhat limited by its inconvenient location in RAM (I own a 16K system). Many thanks to Mr. Bazzurro. I would like to share with other readers a short machine language routine I wrote that performs the bulk of the work of relocating and converting DEBUG without all the hassle of resetting, reloading, etc. as described by Mr. Bazzurro. It is also quite fast. With all due respect to Mr. Bazzurro (who did do all the dirty work of disassembly, etc.), here's a much simpler way to relocate DEBUG: (1)

Load DEBUG, (2) use the M command to enter the short machine language routine listed below (I've included the assembly language statements and comments for those who'd like to know what is going on), and (3) use the J command to execute the routine (ADDRESS?= 6000). Control will be returned to DEBUG when the routine is done.

In a flash, the routine moves DEBUG to its new location and converts all bytes having a value of 43-49H to 73-79H. All you have to do now is restore the 66 addresses listed in the article, write the new version to tape, and you're done.

Conrad Sabatier
New Orleans, LA

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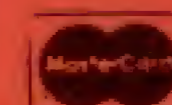
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Letters

PROGRAM LISTING

LOCATION	OBJ. CODE	LABEL	SOURCE	STATEMENT	COMMENTS
6000	21 32 43	MOVE	LD	HL,4332H	;Start of original DEBUG
6003	11 32 73		LD	DE,7332H	;Start of new DEBUG
6006	01 0E 06		LD	BC,1550	;Number of bytes to move
6009	ED B0		LDIR		;Move 'em!
600B	01 32 73	FIX	LD	BC,7332H	;Start of new DEBUG
600E	21 0D 06		LD	HL,1549	;Count is one less than before
					;because loop terminates when
					;HL=-1 (instead of zero)
6011	11 FF FF		LD	DE,-1	;Added to HL to decrement count
6014	0A	LOOP	LD	A,(BC)	;Get byte from memory
6015	FE 43		CP	43H	;Compare it to 43H
6017	FA 1F 60		JP	M,OK	;Jump if less than 43H (no conversion)
601A	FE 4A		CP	4AH	;Compare to 4AH
601C	FA 24 60		JP	M,CONV	;Jump if less than 4AH (convert)
601F	03	OK	INC	BC	;Increment pointer
6020	19		ADD	HL,DE	;Decrement count
6021	38 F1		JR	C,LOOP	;Go again if not done
6023	F7		RST	30H	;Else return to (old) DEBUG
6024	C6 30	CONV	ADD	A,30H	;Convert byte
6026	02		LD	(BC),A	;Store it back to memory
6027	18 F6		JR	OK	;Jump back

I have seen several letters asking if anyone knew of a program that would put graphics, complete with scrolling titles on their videotape. The answer is yes, if you have a Color Computer with at least 16K. The source of the program is Radio Shack. The Art Gallery ROM pack, #26-3061, and it sells for \$39.95

About two years ago I spliced together about five hours of 8MM film that my father-in-law had taken over a 30 year period. After having Fotomat put them on videotape, I wondered if there was some way to add a title, identify the scenes, list the cast, etc.

All you have to do is design your own titles, pictures, etc. using the draw and edit controls. Attach a twin-lead 300 Ohm cable to the antenna connection of your monitor and the other end to your video recorder (mine is a Sony 5400). Start the recorder and key option 5 to "display dynamic results" or option 6 "load and run presentation." When the display is complete, hit the freeze or pause button on the recorder and switch to your other input. I put mine on the tape after the 8MM film had already been recorded so the title I put on the front of the tape has a short blank space between the title and the movie. The trailer I put at the end makes a better transition from movie to graphics.

It may not be as good as a professional production, but you can't beat the price of the equipment and software nor the fun of doing it.

Mike Schottenbauer
Hopewell, VA

Also, an article entitled "Hook your CoCo up to your home VCR",

by Bob Rosen was in the October, 1982 issue of the RAINBOW.--Ed.

I believe that the article "Lowercase and more", June 1983, unnecessarily complicated the process of adding lowercase to a Model I TRS-80. I have installed, with success every time, the lowercase modification in several machines and I do not consider myself a hardware hacker. The easiest lowercase modification involves only one I.C., which sells for less than \$1.00 from many outlets, and a couple of pieces of wire.

The one I.C. is a 21L02, available from Radio Shack and other outlets. To use it, pins 11 and 12 must be bent out and then the chip is piggy-backed onto Z45. All pins except 11 and 12 are soldered to the corresponding pins of Z45 below. So far, that follows the procedure outlined in the article. However, instead of making the remaining connections as outlined in the article, simply connect pin 12 of the added 21L02 to pin 13 of Z27 (directly above Z45 on the main circuit board). Then connect pin 11 of the added 21L02 to pin 13 of Z44 (directly to the left of Z45 - it is more convenient to use the plated-through hole adjacent to pin 13 to make the connection). Finally, cut the thin trace that comes out from underneath Z29 and runs between pins 5 and 6 of Z30. That's it for the simple modification. If you have a late Model I, you may be lucky enough to already have the lowercase character generator chip installed. You do if the cursor character and the tails of the comma

Basic Computing

The TRS-80 User Journal

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I've never heard of Basic Computing. Why?

You've been missing something. Since 1978, we were called 80-U.S. Journal. We have now changed our name to more accurately describe what we write about. We are computerists who publish a journal, not publishers talking about computers.

What is Basic Computing?

We are a monthly magazine covering all models and aspects of the TRS-80 microcomputers. Each issue contains a mix of articles and programs for every level of expertise in the computing field.

We have regular columns and departments to help both the beginning Color Computerist and the advanced Model III assembly language programmer. We make a special effort to make our publication understandable to beginners and advanced computerists alike.

What makes Basic Computing special?

We give complete program listings that are from working programs, not just bits and pieces of computer code. Material in our journal comes from actual computer users, not writers who have little hands-on experience with your model. We discuss and give working programs for every model of TRS-80. If you own a TRS-80 Model I with exotic hardware additions, or use a Model 100 to communicate to a Model 16B, we have information you need.

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Letters

and semicolon extend a bit below the baseline of the other characters. If that's the case, you can consider yourself lucky; you're all finished.

If you are using Level II BASIC or some DOS's like TRSDOS, you will see strange graphics characters instead of the uppercase letters you're accustomed to seeing. There are several solutions to this, including the installation of a SPDT switch similar to that described in the article. To accomplish this, disconnect the wire from the added 21L02; pin 12, to Z27, pin 13. Connect the 21L02 pin 12 to the center terminal of the SPDT switch. Connect Z27, pin 13, to one end of the SPDT switch, run a wire from the other end of the switch to Z30, pin 13. Now you may switch back and forth between normal and lowercase operation.

The preferred solution is to replace Z29, the character generator I.C. When this is done, no switch is required because the oddball, and inaccessible, graphics characters are replaced by normal uppercase

characters. It is possible to purchase the character generator from Radio Shack, but that is expensive. Other vendors also sell replacement character generators of various types. The best I have seen so far comes from Australia. It provides full three-line descenders (the Radio Shack replacement chip provides single-line descenders). It sells for \$12.90 Australian funds, plus \$4.00 additional for an optional printed circuit board. If ordering from North America, and paying in U.S. dollars, add \$3.50 for postage and bank exchange fees.

What you are buying is a pre-programmed 24 pin EPROM, and adequate instructions for those who are somewhat familiar with the insides of a TRS-80. The unit is not designed for installation by beginners, but experienced hardware hackers should have no difficulty. To obtain it, order model "JACKGEN 3" from Don McKenzie, 29 Ellesmere Crescent, Tullamarine 3043, Australia. Don normally provides same day turn-around. In

my case it works perfectly and I am very pleased with the result.

Jack Decker
Sault Ste. Marie, MI

In the May, 1983 Notes, etc. section there was a response from Mr. Wayne King to my File Copy Utility which ran in the January issue. Unfortunately, his method of clearing more than 32767 bytes of string space was not sufficient for my Disk Interchange Program, DIP. DIP uses a great deal of string space and, as published, will frequently lock up in garbage collection.

However, I now have a new version of DIP which does not suffer from this deficiency. It will also automatically configure itself for 32 or 48K and allows the user to optionally specify if verification of the destination disk is required. I am happy to make DIP available to readers for \$10.

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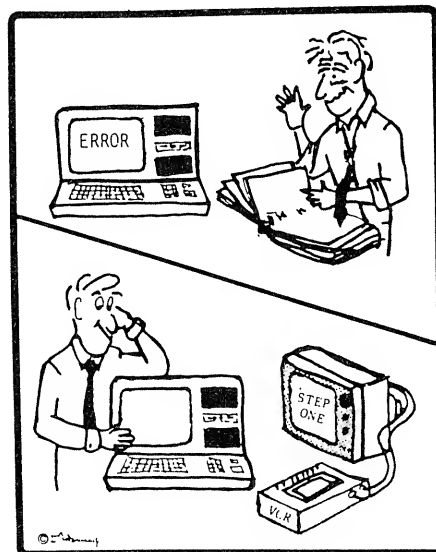


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Notes, etc.



By Cameron C. Brown

Who are we?

This issue has a circulation of over 50,000 and we suspect that many readers are seeing us for the first time. A short discussion about our magazine is in order. For over five years we were called *80-U.S.*. Our name was changed to better describe what we do. We were, and still remain, a journal for the TRS-80 user.

The departments we have in each issue are a direct response to reader requests. Basically BASIC is for the beginning programmer. Here is where you can glean insights to writing your first programs. Even experienced computer users can pick up a trick or two from it.

If you want BASIC in more depth, be sure to look at BASIC Bits and Files and Foibles. BASIC Bits, by Thomas Quindry is aimed at the Model I/III/4 audience. Direct your BASIC and assembly language questions here. Each month you can count on Tom to let you in on something that is not in your manual. Terry Dettmann's Files and Foibles is for the practical user. Each month he will give detailed excursions into file handling techniques. His code is so well structured and commented that it will almost always run on any model.

Exploring VisiCalc, by Tim Bowman, takes us through one of the most popular pieces of software ever written. Com 80, by Don Stoner, and In The Chips, by Spencer Hall, are two special interest columns we run on a regular basis. Don will see to it that all your telecommunication questions are cleared up and Spencer's task is to help you become a confident assembly language

programmer.

You can always look here, in Notes, etc., for corrections, alterations and improvements on previously published programs. Be sure to look in our Letters to the Editor section as well, many times a reader will send in just the information you need.

Those are some of the columns you can expect to see regularly. If there is a topic you want to see, or a question that needs an answer, drop us a card or letter. Our columnists are anxious to help.

Besides the regular features, we run many programs and articles that are from you, the readers. Each issue will have programs and news for almost every model TRS-80. If you have a different or interesting use for your computer, or a program that can be beneficial to others, be sure to write and ask for our Author's Guide. We look forward to hearing from you, either with a question, a comment or a potential article.

New president at Microsoft

Mr. Jon Shirley, former Vice President of Computer Merchandising for the Tandy Corp., has been named President and Chief Executive Officer for the Microsoft Corp. The replacement follows the resignation of Mr. James Towne. According to local media, Mr. Towne disagreed with the decision of Microsoft chairman William H. Gates to move the company vigorously into retail software sales rather than emphasizing its role as a supplier to computer manufacturers. Mr. Shirley takes this position after serving in the Tandy Corp. for 25

years. The Tandy Corp. has yet to announce who will take over the role served by Mr. Shirley.

The MC-10

This latest machine from Tandy is different than all the others. It uses a 6803 processor and has TeleBASIC 1.0 which is a version of Microsoft Color BASIC. The language is close to that in the Color Computer. It is a little larger than the Timex/Sinclair computer and has its own cassette I/O. The I/O format is unique and programs magnetically recorded on the MC-10 cannot be loaded into the Color Computer (actually, they may load but won't run due to different end-of-line markers). You can re-enter the programs by hand from an MC-10 to a Color Computer and they will probably run; the two languages are very similar. Its price makes it Tandy's offering in the "disposable computer" market. Be sure to see Don Scarberry's review of it in this issue.

The Model 16B

This upgraded Model 16 is really just a reorganization of how Tandy plans to sell to the high-end market. Many people were choosing to purchase a Model 12 and upgrade rather than buy a Model 16. That way they got the extra keys, a lower "profile", and the extra card cage slots in the rear. The 16B is just an upgraded Model 12. There is no real change in the 68000 architecture of the computer. Multi-users should find going from three to six users a lot easier since the needed card slots are already in the 16B.

Tape Journal

Due to very low response, we have

discontinued offering our published programs on cassette. We are filling all orders that have been placed for January through June tapes. Annual subscribers should have received a full refund by now.

Corrections

The Model 100 printer formatter by Ed Juge in last month's Tandy Topics had a bug in line 350. Change the reference to line 358 to be . . . THEN 360 ELSE . . .

Electronic Watchdog by George Farnsworth, June 1983, runs just fine. We forgot to label the program for Model I non-disk systems. Model I disk users will get an illegal function call in line 80 when attempting to run the program. To boot-up in Level II mode, hold the break key down while depressing the reset button. You do not have to set memory size; the program will work on a 16, 32, or 48K machine.

If you want to run the program on a Model III system, make the following changes. Our thanks to Mr. Dan Sitch of Pittsburg, NH for sending them in. For 48K Model III Disk BASIC, change line 40 to read: 40 OUT 255,8: S=INP(255): IF S<>124 AND S<>125 THEN 60 ELSE 40. Also add line 75: 75 DEFUSR0=S1+S2*256-65536, and change the two USR(SS) in line 80 to USR0(SS). For Model III non-disk users, just make this change to line 40: 40 OUT 255,8: S=INP(255): IF S<>108 AND S<>109 THEN 60 ELSE 40. The two pokes in line 110 may be deleted, or left in, when using Disk BASIC on the Model III.

If you are using a CTR-41 tape recorder, remove the small, black insulator plug from the microphone jack. This plug is normally used to disengage the built-in microphone so that programs saved on cassette will not contain outside noise. Removing the plug will allow the Watchdog program to hear the outside noises (intruders) and react accordingly.

The June column of BASIC Bits, page 59, had an error in the table. Normal Level II Model III BASIC storage starts at 43E9H, not 42E9H; thus PEEK(16549) should be 67, not 66 as we stated.

We are saddened to report that Mr. Jeffrey D. Clack, the author of

Vehicle Maintenance, April 1983, has passed away. For those of you who wrote to him requesting more information and the program, we have been informed that his brother-in-law, Mr. Edward R. Sargent, 6431 West 74 Ave, Arvada, CO 80003, will be responding and answering all inquiries. We thank you for your patience.

Antimath, by Craig Hunt, May 1983, had a slight mixup in line 280. After the code L4" is the beginning of line 290. Be sure to separate them. It seems our computer stripped out a linefeed when we printed it out.

Puzzler

Our June question asked how could you, using machine code, swap the A and B registers without using an intermediate storage register. Many people sent in the three lines: 1) PUSH AF, 2) LD A,B, and 3) POP BC. It works, but it does destroy the flags in the process. A more elegant method, and the one we were initially looking for, is 1) XOR A,B, 2) XOR B,A, and 3) XOR A,B. It

works, but we found out that the exclusive or on the Z80 cannot be used that way on the A and B registers. We did not specify the type of processor and for brevity we have chosen the one submitted by Kent Meyers of LeRoy, MN to be our winning answer. On his Color Computer you just do EXG A,B.

This month we are going back to BASIC code. When sorting strings, the computer looks at the ASCII values of the letters and this can result in output that is not what you want. For example, Zeta will be printed out after ZZZZ, not before. Can you devise a simple way to have the computer ignore the capitalization and sort on just the actual order of the letters? Be sure to watch out for punctuation and the use of periods, commas, apostrophes, etc. Send a copy of your working code and a sample printout to August Puzzler, *Basic Computing*, 3838 So. Warner, Tacoma, WA 98409. Do not send tapes or disks; no material is returned. The winner receives \$10 and a free tour of our facility.

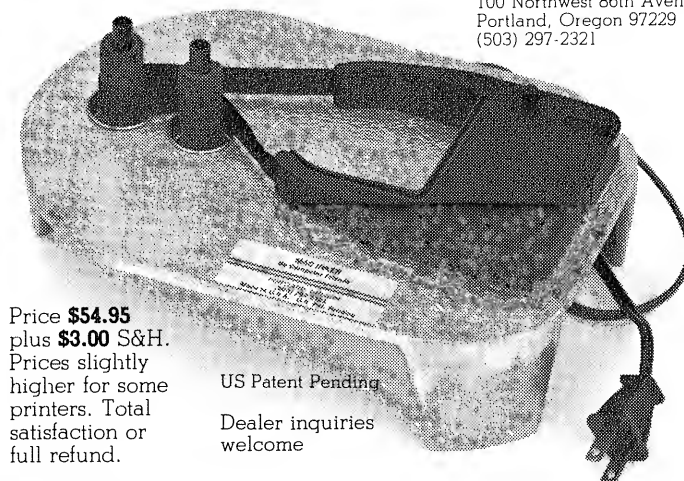
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Everywhere we look (well, almost everywhere) we see computer-generated printed pictures: on T-shirts, magazine advertising, billboards and sides of buildings. Why shouldn't those of us with the world's greatest micro be able to join the party? Well, we can. But first, some fundamentals.

Two factors influence the quality of the image on black and white pictures (recognizing that "quality" is quite subjective). First is the number of shades of gray. Very few objects in real life are truly black or white. They are normally made up of infinite shades of gray. The image we see as a single light passes through a translucent object and yields not black and white, but many shades of gray. A highlight, produced by intense light, smoothly fades into ever-changing shades of gray as it goes around the surface of a sphere or other object. Multiple lights produce a different kind of shading. If we are intent on making quality computer pictures, we need to generate shades of gray. Unfortunately, the TRS-80 monitor is limited to two shades as a pixel is turned on or off. We can resort to a printer, but we don't have a clearly-defined set of ASCII characters to produce shading. We can, however, get grays by overprinting one character over another. For example, an X printed over O produces a Ø. This is "darker" than either of the single characters.

For my pictures, I use 26 shades of gray made up of two passes on the printer. That is, I first print the entire picture using one set of characters. I then manually rotate the printer back to reposition the paper to the start of the first picture and overprint with the second set of characters. This process will allow you to use any printer for your pictures. The 26 shades (one for each letter) are:

```
CODE      A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
SHADE #1  . . - - = = + + Y Y : I * S O W O O H I O I H H O
SHADE #2  . - = + . - M - - + = : * * I *
```

The first character is a blank. You may wish to devise your own character set or even make three or four passes over the printer to get more contrast.

The importance of the number of shades of gray can be seen in Figure 1. The number of shades are 26, 6, and 2, respectively. The quality begins to degrade slowly. At two shades, we get kind of an outline. Not much improvement over 26 is seen if we go to 50 or even 100 shades.

The second factor that influences picture quality is the pixel size. Much like the grain size used on different photographic film and paper changes its quality, smaller pixel sizes produce the better computer pictures. The pictures in Figure 2 show the effect of pixel size. The pixel sizes are 2, 4, and 8. Notice how the quality degrades rapidly beyond a pixel size of 2, and at 8, the image is essentially unrecognizable.

At this point, I can introduce the program in Listing 1 (PRINTIT). The data set for Abe (in Figure 3) contains 64 rows and 64 columns of 26 shades of gray. Recognize that you are seeing the shade codes and not the actual shades. Horizontal and vertical "scale factors" (lines 170 to 180) allow stretching and shrinking of the picture. These are needed to insure the proper proportions of the final picture since many printers print ten characters per inch horizontally and 6 lines per inch vertically. Pixel size and number of shades can also be varied by the user.

Several points are noteworthy:

1. A vertical scale factor of 6 (for example) causes the program to skip every sixth line of input (see line 170). This makes the picture narrower. Use zero for no skips.
2. A horizontal scale factor of 1.25 will stretch the 64-character picture to 80 characters. Use 1 for no stretch.
3. After the user selects the number of shades of gray, the program always selects the extremes. Thus, for two shades, the program will select CODE A and Z. For three shades, it will select A and Z with M.
4. Pixel size variations are achieved by averaging the shades of adjacent parts of the picture. For example, if you pick a pixel size of 2, the program will average four points (two in each direction). If you select a pixel size of 64, you will get a single solid gray picture which is the average of all 4096 points.

5. You should recognize that if you scale, change the number of shades or pixel size, your run time will go up.

6. As I mentioned above, you get shades by overprinting one picture onto another. After the first picture has been printed, the program will screen print REPOSITION PAPER AND <ENTER>. This is your cue to roll back the paper to the start of the first picture for overprinting of the second set of shades. When the second printing is complete, the REPOSITION will be shown again. Ignore this since you are done.

You may wonder how to get the data set. The answer is

“with considerable effort and patience.” Virtually any picture can be “digitized.” The key to good pictures with proper shading is to accurately read the gray shades from the master picture. The eye does not do it well, but you can get acceptable pictures by following the method described below.

Divide the picture you’re going to digitize into small squares by ruling it with horizontal and vertical lines. I’ve found that square sizes of about one tenth of an inch are about right for an 8” by 10” picture. That’s 80 by 100 squares instead of 64 by 64, so I pick the best part of the picture to actually “read.” Next, establish what you think are the lightest and darkest squares. Call the light ones A and the dark ones Z. Now comes the hard part. Look at each square and judge its shade on this A to Z scale. I write the letter into the square so I can then load it into the data set. A 64 by 64 image takes over 4000 readings and I find my eyeball can’t distinguish subtle changes, so I use only six when I’m reading pictures this way. The six shade picture of Abe in Figure 1B isn’t too bad.

The program in Listing 2 (SETUP/MAN) is used to get the data onto disk or tape. I load the shade codes into DATA statements so I can use the EDIT commands to correct errors. After running this program, the data is on disk or tape and I can run PRINTIT.

There is a better way. At my local electronics store, I found some small photoresistors. They cost about 50 cents each and were so cheap that I bought several for later use. They had several sizes and I chose ones which were about $\frac{1}{84}$ in diameter. These are not the photo-

transistors that are used in light pens. Phototransistors are either on or off, depending upon whether or not a threshold amount of light falls on the active elements. Photoresistors, when connected to an ohm-meter, measure continuous resistance depending upon the light level. It is like your house dimmer switch rather than a light switch. This makes it ideal for sensing the shades of gray.

Next, I had to find some way to convert the voltages read with the photoresistor to something the TRS-80 could read. Several analog/digital converters are available, but I chose one by Alpha Products (called ANALOG-80*) because it had eight input ports (although I only needed one for this job) and was easy to use. Figure 4 shows how I wired the photoresistor to the A/D converter.

Since I had some trial and error to get the right setting on the potentiometer (pot), I used the program in Listing 3 (ADJUST) to help me adjust it. Each time the program says to POINT TO A BRIGHT SPOT, I do so and hit enter. It then says to POINT TO A DARK SPOT, and I do so. I can then make a slight adjustment in the pot. (Slight movements can make a surprisingly large difference.) Keep adjusting the pot until you get the biggest difference between the light and dark readings. The program prints this difference for you. Once the pot is set, you should not have to readjust it. It is important to note that changes in room light, the condition of the picture you are going to read, and other factors may force you to readjust once in awhile.

The next step was to build a “reading” table. This is

Figure 1A

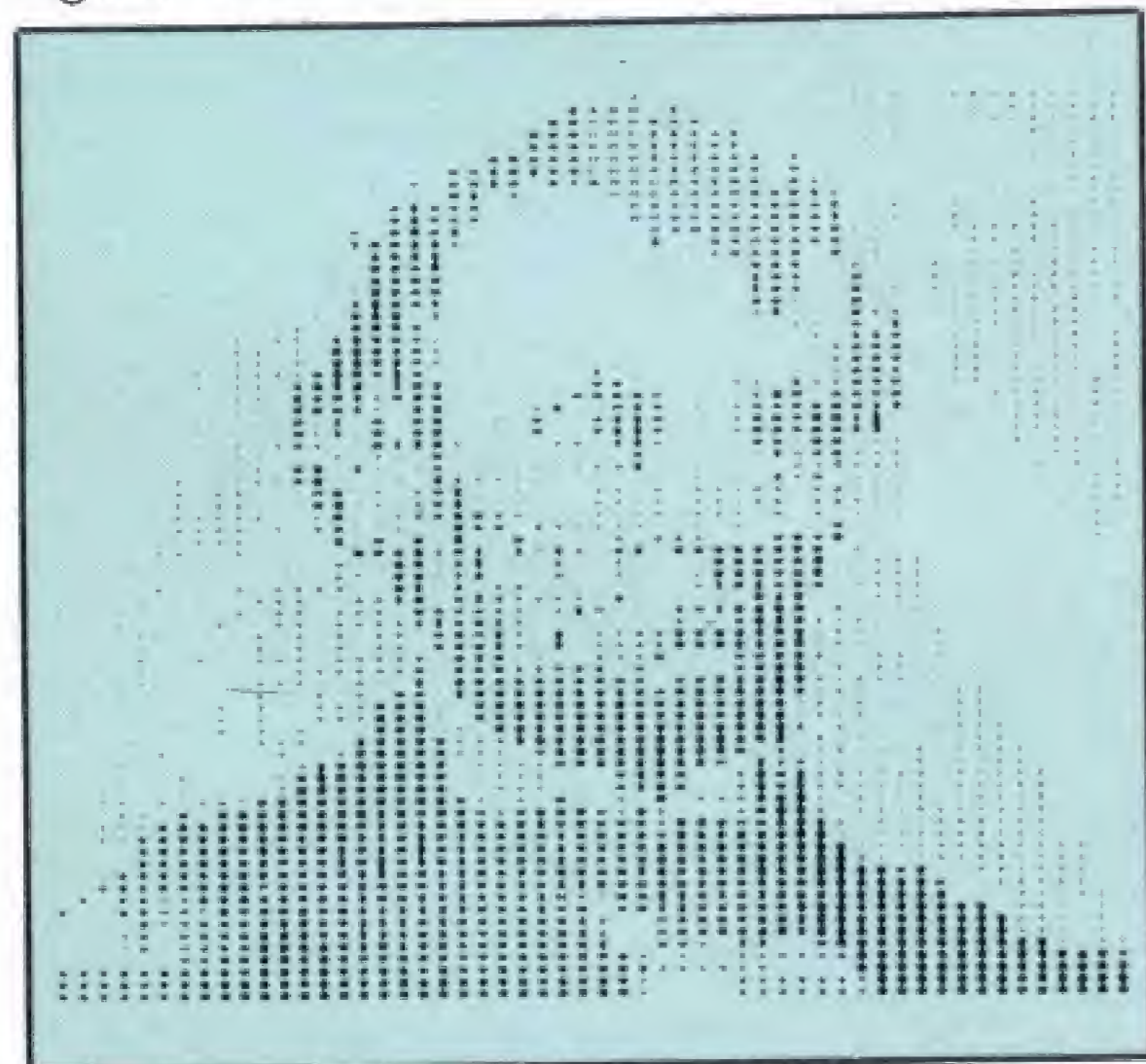


Figure 1B

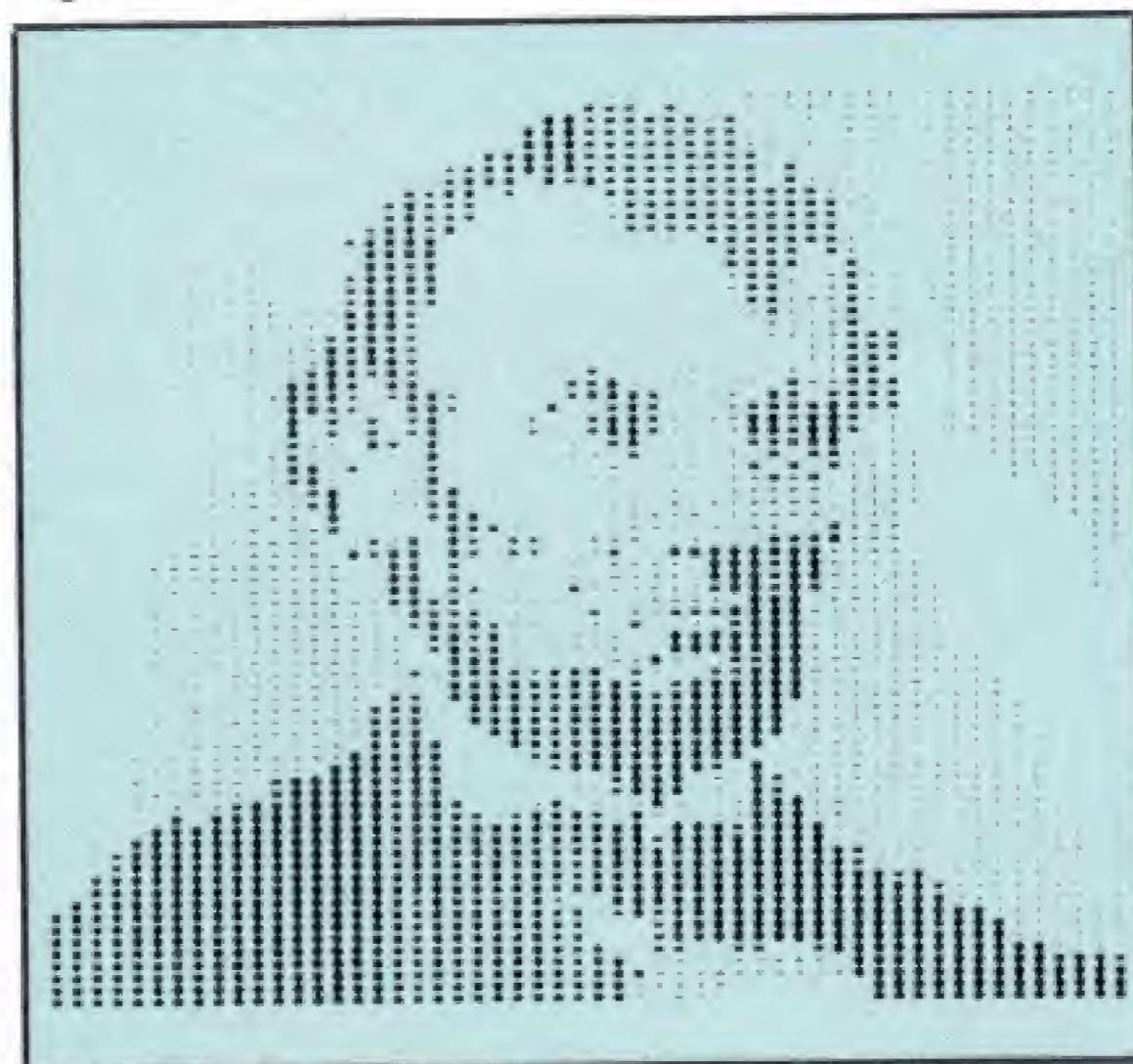


Figure 1C

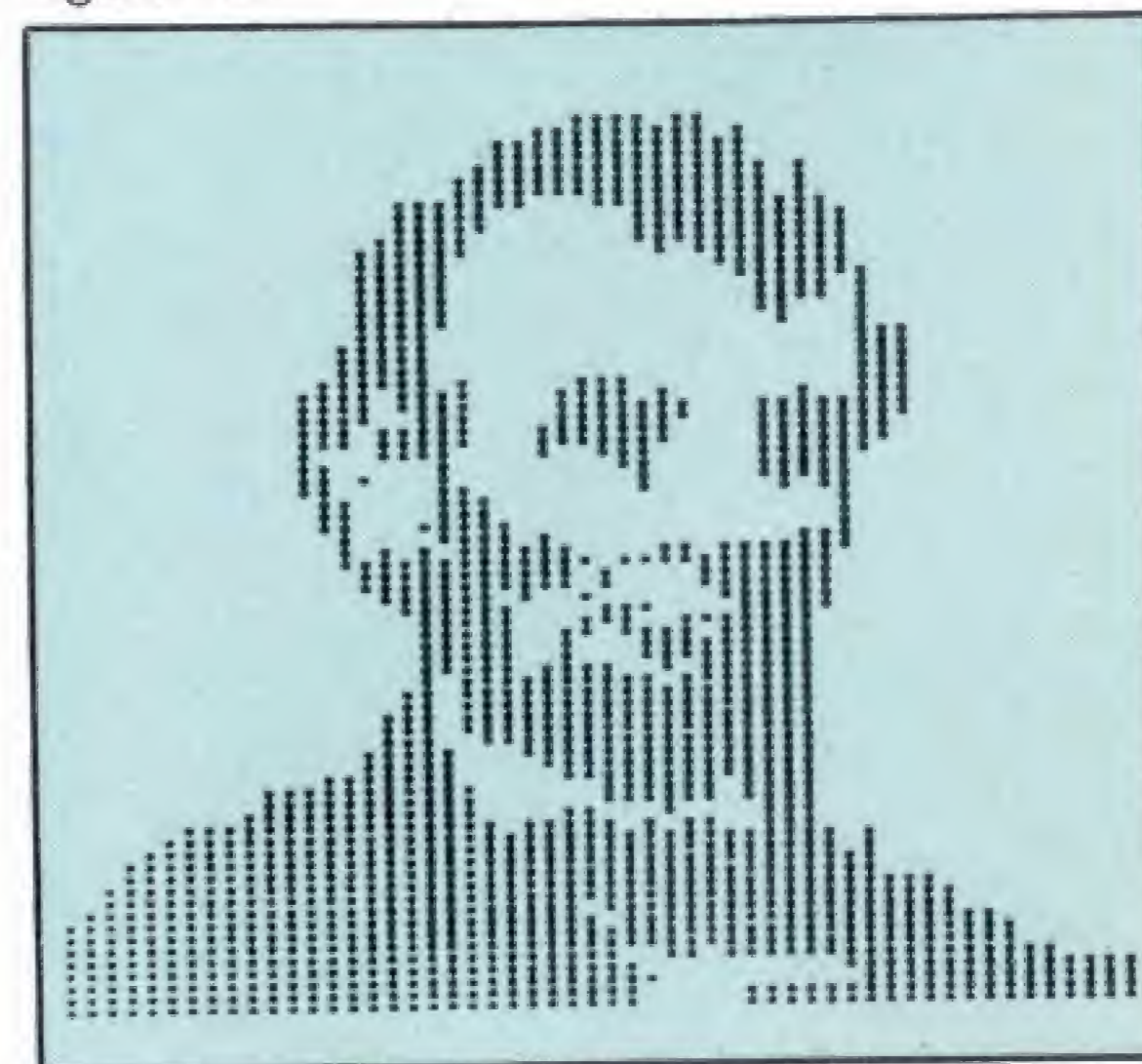


Figure 2A

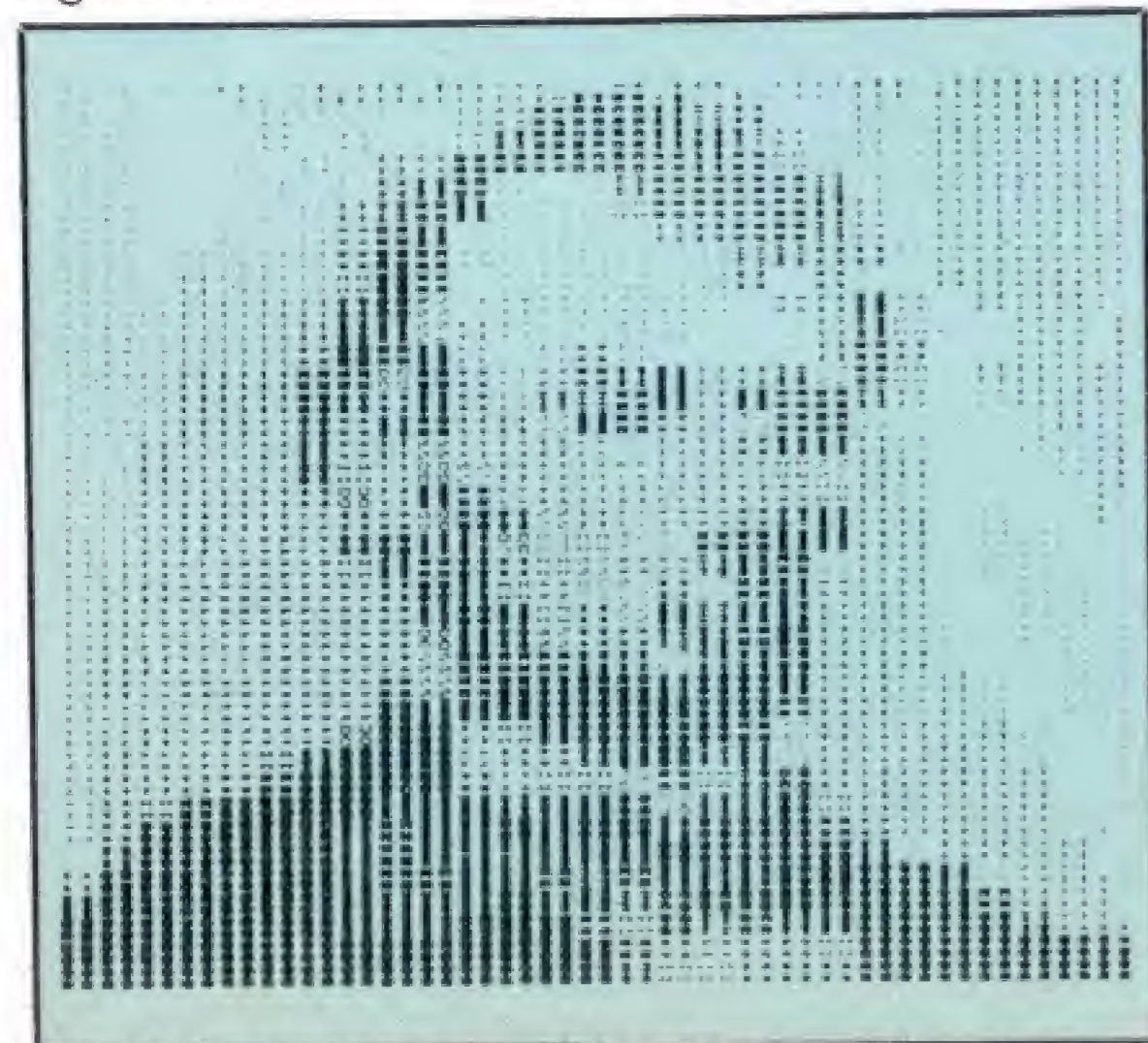


Figure 2B

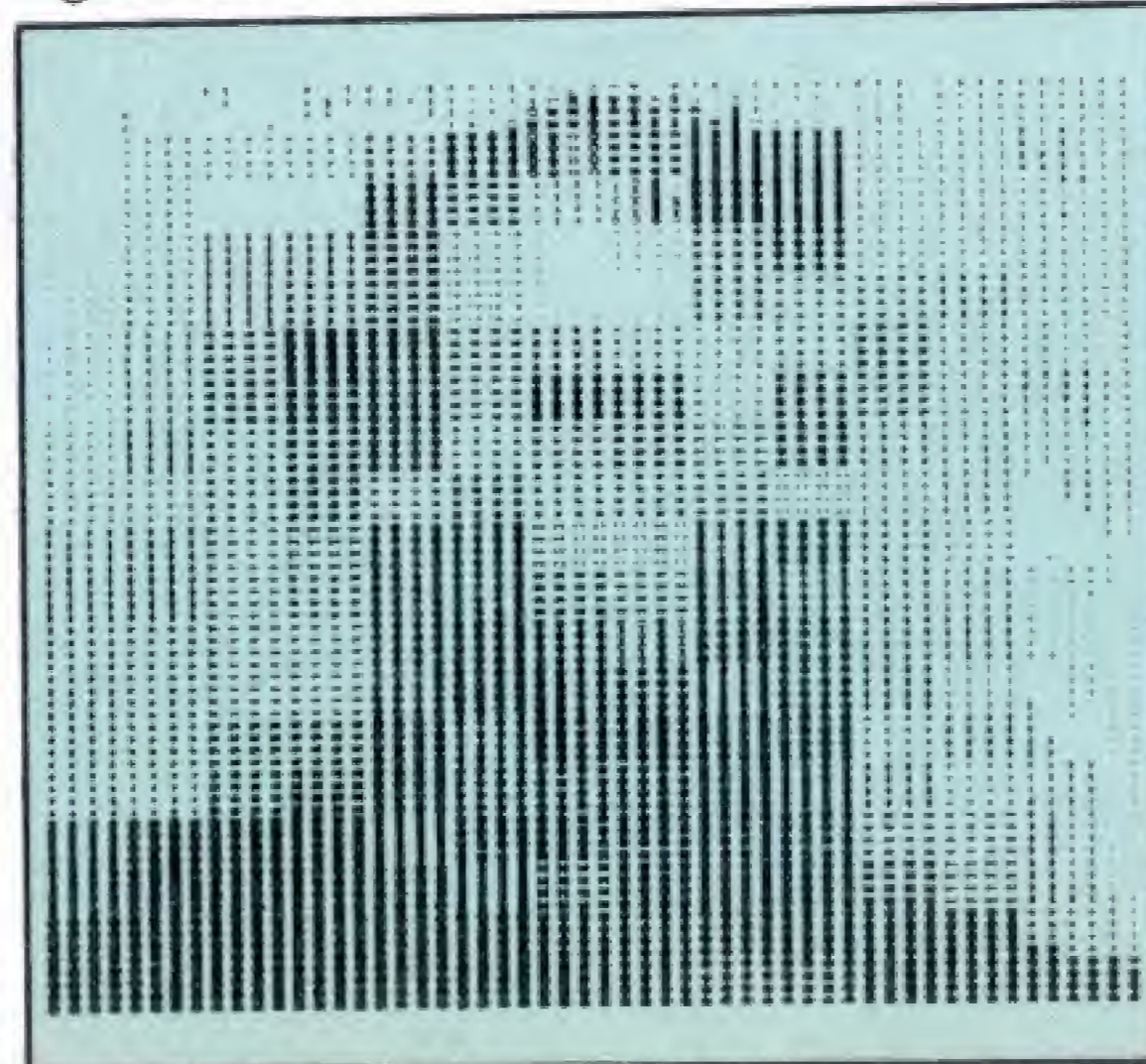
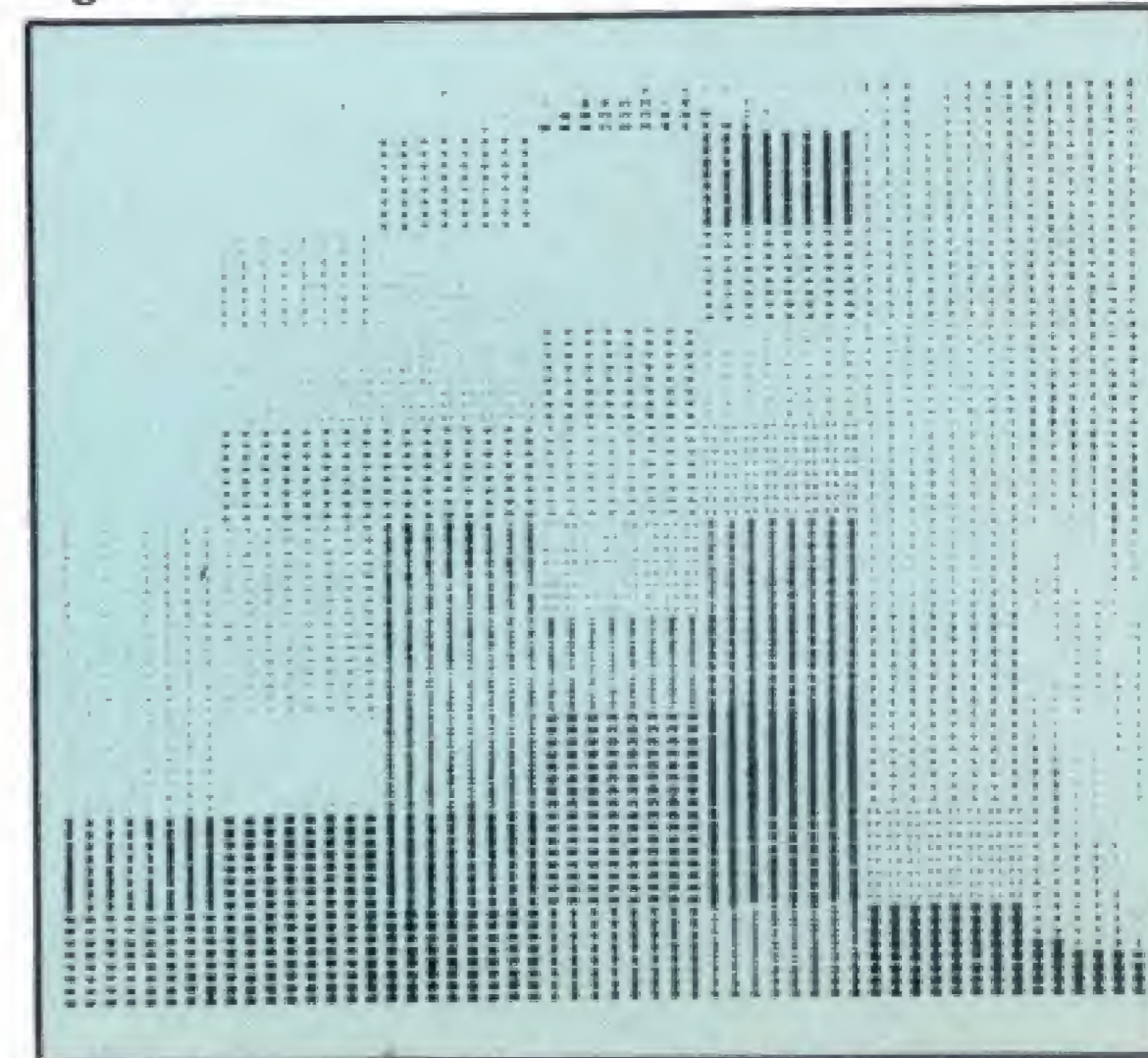


Figure 2C



Pictures

shown in Figure 5 and uses a 35mm slide projector to project the image onto ground glass which has been ruled into one-tenth-inch squares. The glass was obtained from the local hardware store. Each square is then about the size of the photoresistor. You may have to move the projector toward, or away from, the mirror to make the projected picture fill the size of your ground glass reading table. You can use color slides, but I've found that black and white slides project and produce the best digitized pictures.

The program in Listing 4 (SETUP/AUT) does the job. With the sensor in one hand and the other hand on the enter key, I move the sensor from square to square across the projected image a row at a time. I position the sensor over a square and hit enter, move the sensor to the next square and repeat this until an entire row of squares has been "read." The screen shows my progress and asks if the row is OK. If it is, hit "Y" and proceed to the next row. If you have made an error in moving the sensor or something else, hit "N" and the program will let you re-enter that row. It takes 4096 of these readings to get your 64 by 64 picture coded. After the entire picture has been read, the program asks for the filename to store the picture codes. Once this is entered, you can print the picture using PRINTIT as above.

A few notes about this program are in order. The ANALOG-80 returns a number between zero and 255. My pictures use only 26 shades, so I need to convert the

zero to 255, range to 26 shades, and put them into the string for the picture. This is done at line 240. Lines 220 and 230 are required to activate ANALOG-80. It takes almost one and one-half hours to read in a picture.

Tape users may want to combine ADJUST and SETUP/AUT. I chose to keep a separate copy since I can use it for other applications with my ANALOG-80.

Incidentally, I have since found many other uses for the ANALOG-80 and consider it a good accessory to my system. For example, I use it to sense the outside temperature for my morning wakeup call. I also use it to read punched paper tape as an additional input device for my TRS-80.

Depending on the camera setting used to produce the slide, the adjustments on your pot, the actual picture you're trying to do, and other factors, your first printer-generated picture may be disappointing. Some method is needed to salvage poor pictures. The most common way is to use a technique called "frequency spreading."

As we look at a picture, we see that some shades appear more frequently than other shades. We can sometimes "enhance" the quality of a picture by redistributing the number of times each shade is used. Figure 6 shows Abe with a distorted number of uses of some shades. Figure 7 is a "frequency distribution" of this shading. The abscissa is a shade number from 1 to the 26, and the ordinate is the percent of the total elements (4096) that a particular shade was found.

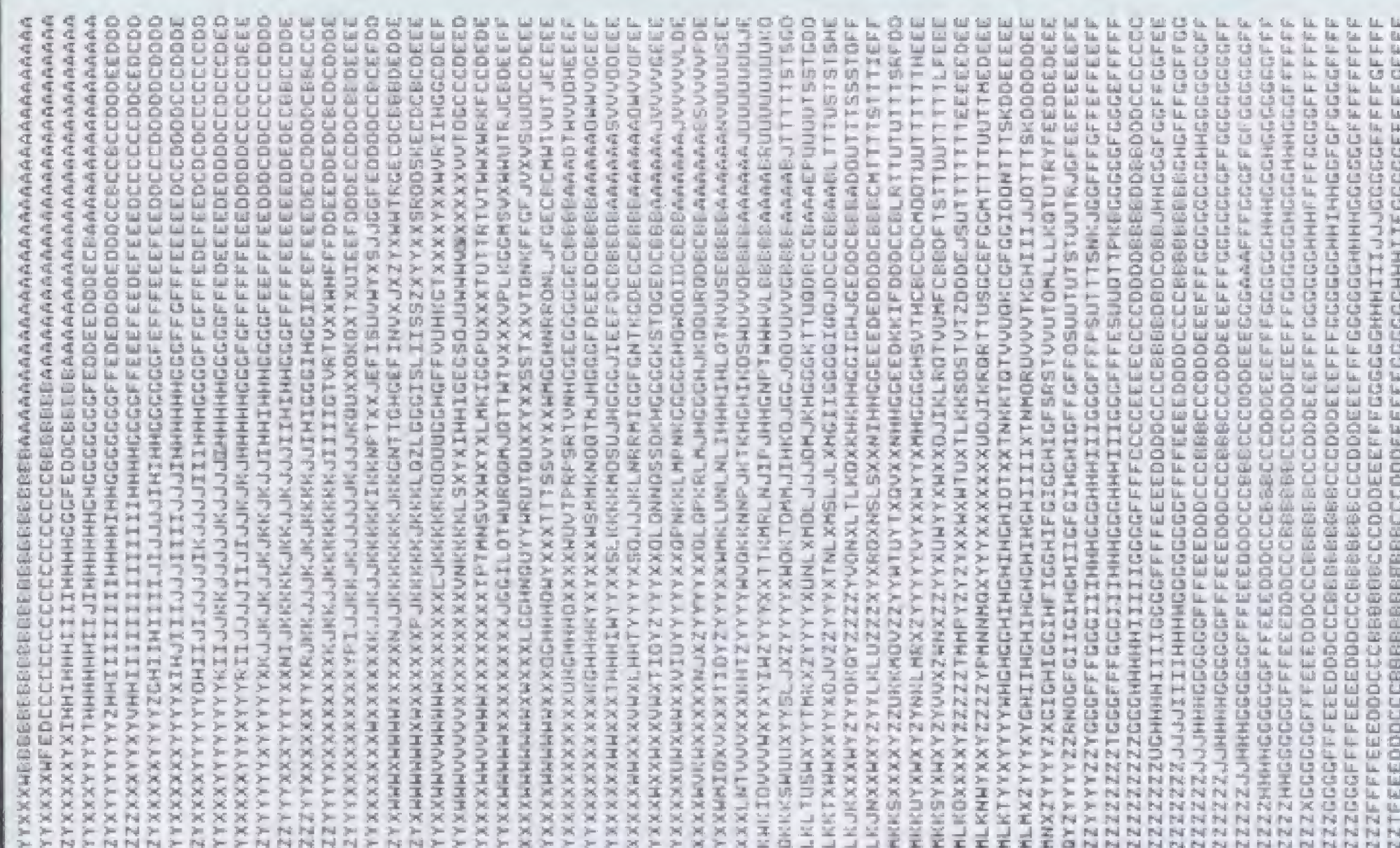


Figure 3

Figure 5

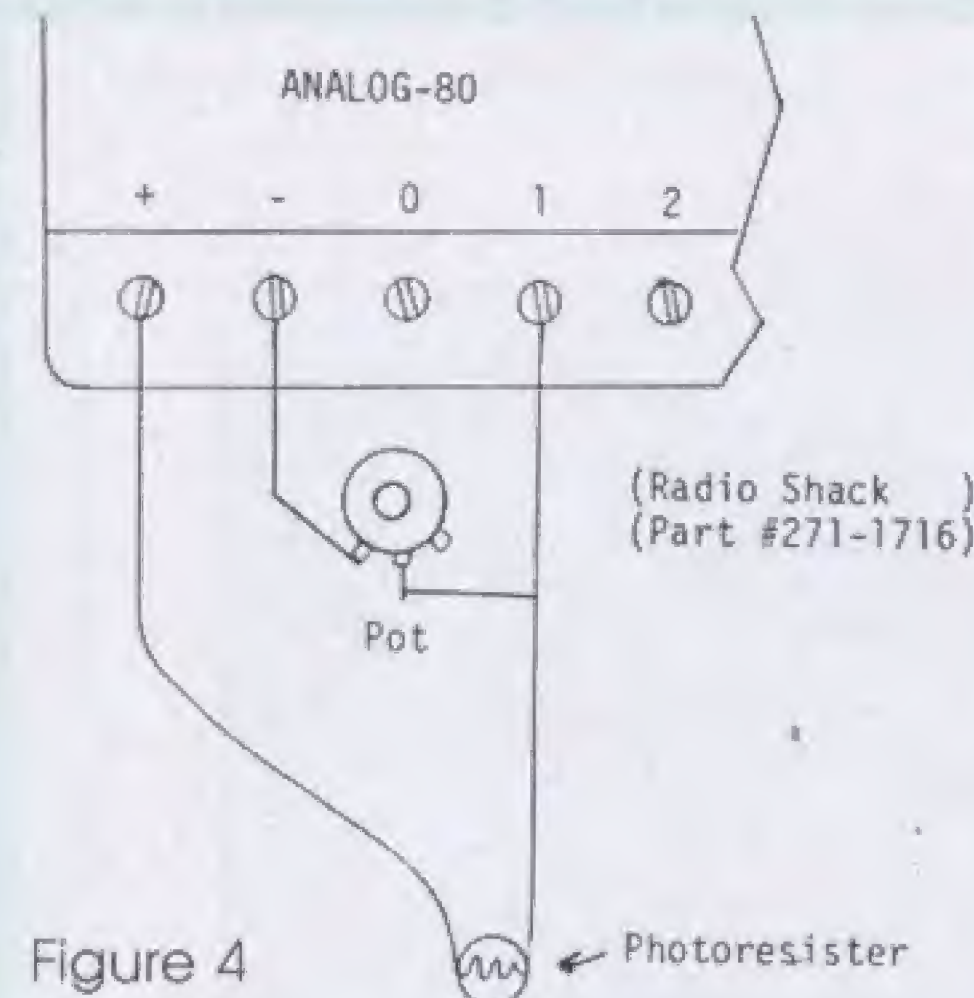
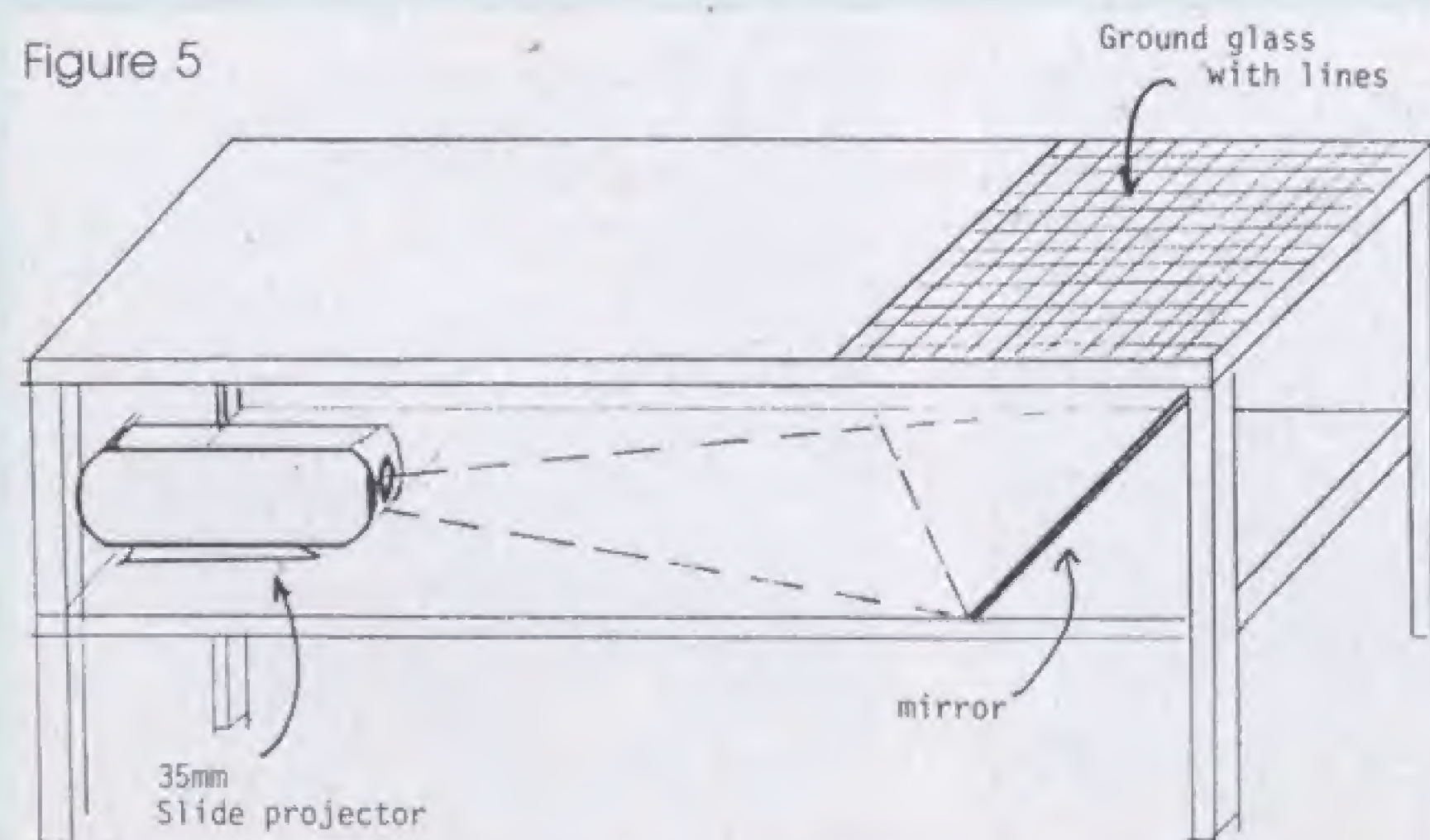
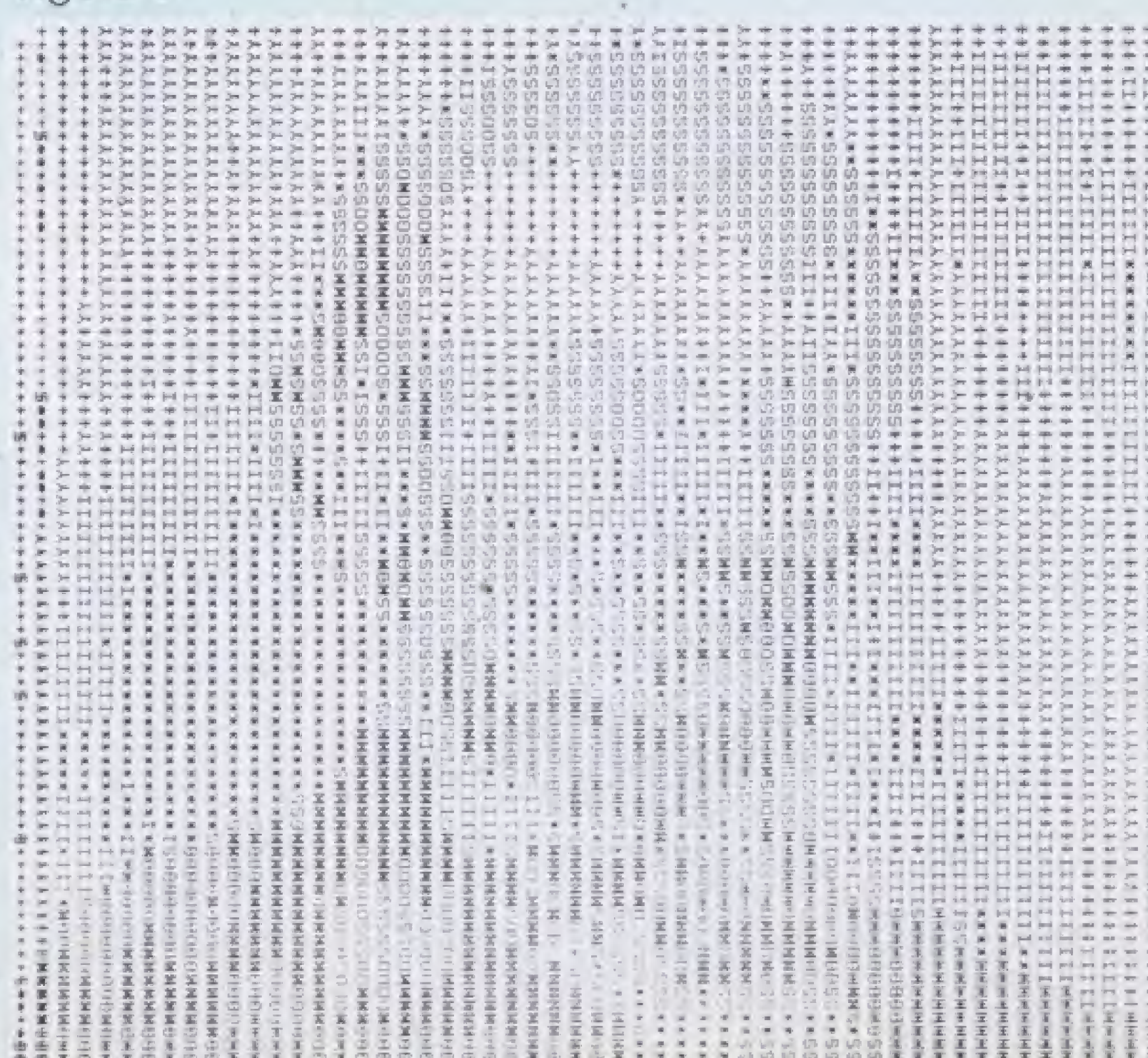


Figure 4

Figure 6



DATAGRAPH

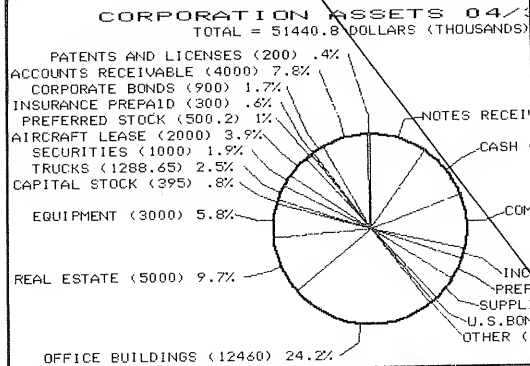
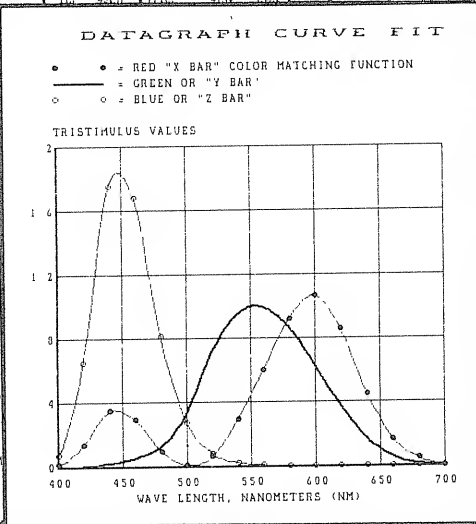
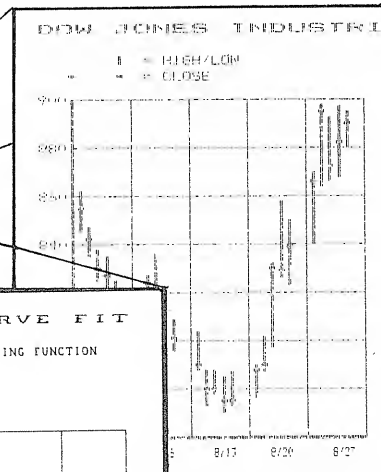
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January	NYCI	BJIA	BJT	BJU	SIP	500	Advances	Declines	U. Vol	En. Vol	
1231	77.86	963.09	390.10	114.42	135.76	1040	593	24,838	11,336		
102	78.26	972.78	401.43	115.12	136.34	1062	495	17,275	8,405		
105	79.09	972.55	405.77	117.81	137.97	1074	433	41,159	14,669		
106	79.14	984.69	402.99	117.16	138.12	1049	649	38,463	23,709		
107	77.29	983.59	391.19	115.19	135.68	216	1555	5,965	85,844		
100	76.20	965.78	383.24	114.09	133.66	578	1023	11,759	37,975		
109	76.44	960.69	384.82	112.89	133.48	997	620	28,933	15,733		
112	76.52	968.77	388.34	112.85	133.52	928	633	25,813	19,192		
113	76.25	965.16	387.10	112.49	133.23	578	993	12,407	24,552		
114	76.55	966.47	389.55	112.38	133.47	914	612	25,382	13,773		
115	76.99	969.07	396.10	112.60	134.22	739	691	21,537	13,526		
116	77.33	973.23	401.98	113.22	134.77	860	642	23,22	14,425		
119	77.10	976.99	405.55	114.35	136.37	740	756	15,113	15,338		
120	75.81	950.68	394.69	113.80	131.85	37	1172	5,859			
121	75.37	946.25	392.46	113.09	131.36	547	534	15,738			
122	74.76	940.44	392.03	113.09	130.26	407	1024	11,057			
123	74.72	940.19	391.64	111.76	130.23	683	780	16,604			
126	74.45	938.91	387.19	111.47	129.04	534	893	14,674			
127	75.17	949.49	394.64	111.72	131.12	943	559	28,175			
128	74.70	942.55	395.43	112.49	130.34	626	788	17,433			
129	74.67	940.07	393.04	112.74	130.24	774	710	19,458			
132	74.27	947.27	402.22	112.82	129.55	727	776	16,777			

WORKSHEET					
NYSE Vol	104 NYCI	A-B	ADL		
1231	41.21	77.23	447	-1592	
102	28.87	77.49	567	-1025	
105	28.24	77.78	821	-132	
106	67.40	78.98	409	277	
107	92.89	77.87	-138	-1062	
100	55.35	77.57	-450	-1512	
109	59.19	77.38	289	-1223	
112	48.76	77.23	295	-928	
113	48.99	77.67	-415	-1241	

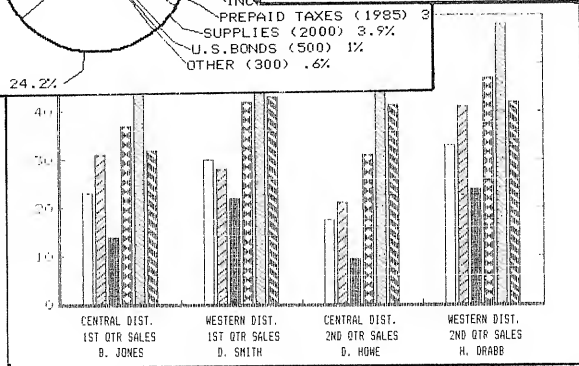


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For example, shade 9 was found about five percent of the time. We see considerable clustering around the middle shades. (In fact, I made an attempt to make it a statistically normal distribution for this demonstration of the technique.) When these percentages are accumulated across all shades, Figure 8 results. In other words, the percent of any one shade is added to the sum of all prior shades. For clarity, I connected a line across the top of the shades to the typical shape of the normal distribution. This addup is called the "normalized cumulative distribution."

The enhancement process that seems to work the best is to make a "linear adjustment" where we redistribute the number of uses of each shade by a linear transformation. The program in Listing 5 performs the adjustments (ENHANCE/LIN).

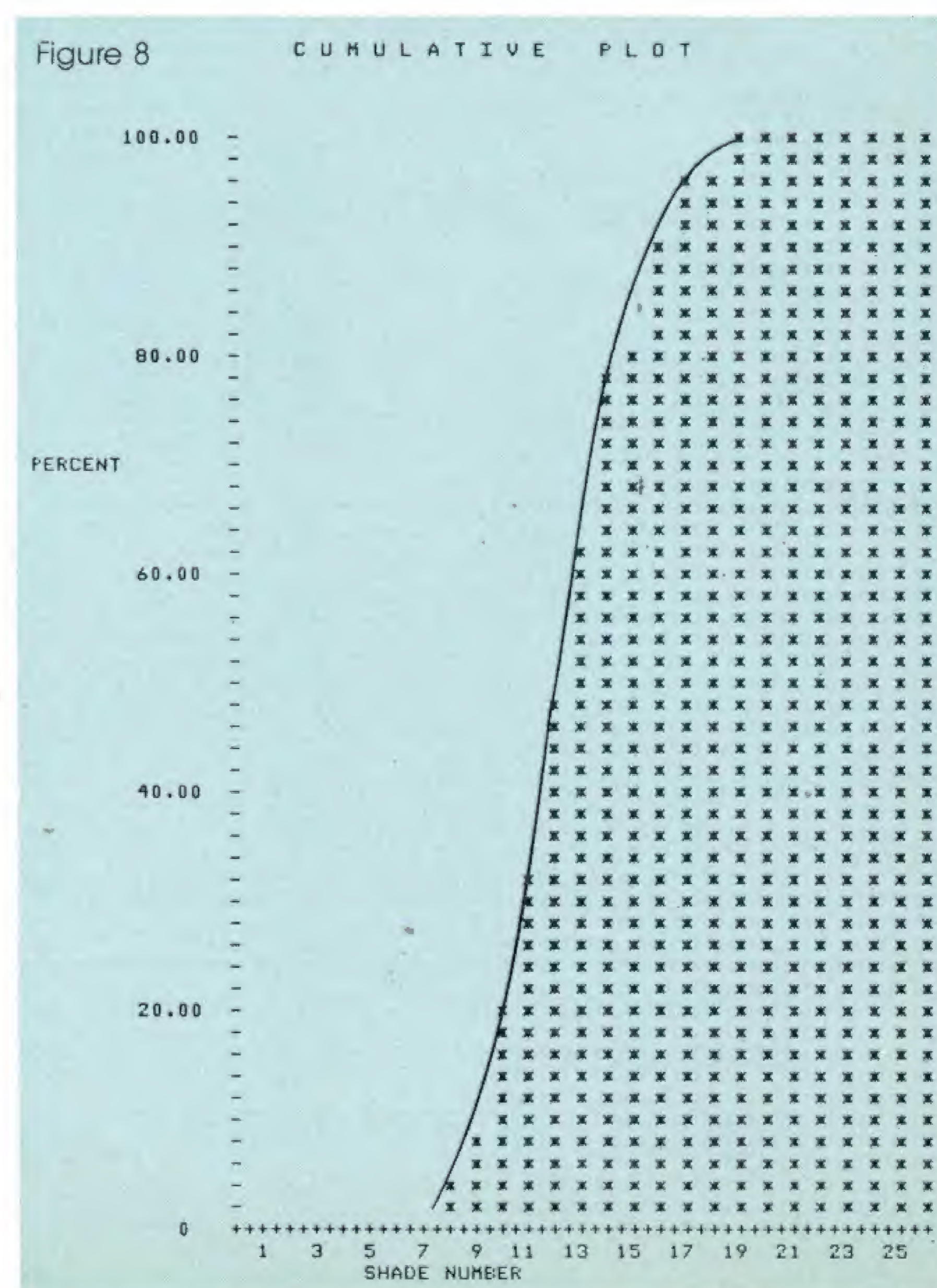
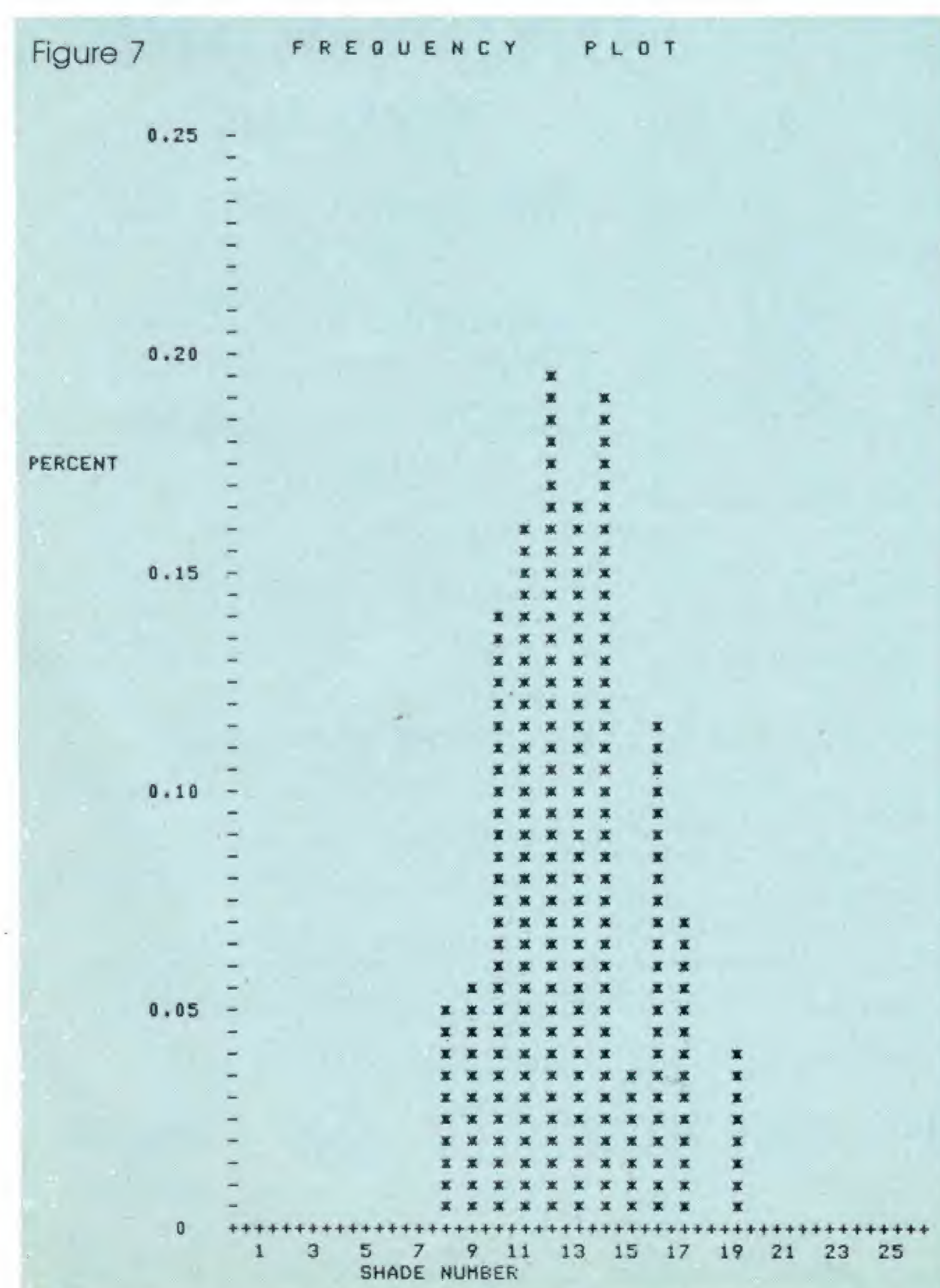
Lines 150 to 200 read in the picture. Lines 210 to 310 add up the number of times each shade is used. Lines 320 to 350 calculate the percent of usage, and lines 400 to 420 add up the cumulative distribution. Both the frequency distribution and cumulative distribution are lineprinter plotted using the subroutine at line 700. Lines 470 to 490 refigure the linear redistribution and lines 500 to 610 adjust the picture shade codes to the new distribution. The picture is saved in lines 620 to 670 and can be printed by PRINTIT as before. The enhanced picture that results from a linear transformation of Figure 6 is shown in Figure 9. It is not as good as that of Figure 1a, but considering that it was made from the rather poor picture of Figure 6, it's not too bad.

This enhancement program makes the plots of the data before enhancement. If you want to see how the enhancement has altered the frequency and cumulative distributions, you have to rerun the program using as the input file, the previously saved. The resulting plots for Abe after linearization are shown in Figures 10 and 11. One should not expect a perfect linear transformation of discrete data, but the resulting cumulative plot does look pretty good.

Several other enhancement techniques are available to bring out various parts of a picture. I particularly like the one which I call ENHANCE/EDG in Listing 6 since it finds the edge of a picture. Actually, it looks for places in the picture where the shade changes by a threshold value supplied by the user. Figure 12 is an edge picture of Abe from the data supplied in Figure 2. Lines 170 to 210 read in the picture shade codes. Lines 310 to 450 pick off the shade under consideration and the four points around it. Line 470 redraws the picture shades into a different string array. Lines 540 to 590 save the picture in a file that can now be printed by PRINTIT.

You can develop several other types of enhancement techniques. How about a full silhouette once you have the edge picture? You can also reverse the shades to get some interesting pictures. If you make pictures of tanks or ships, you might try to make a targeting method where you shoot at the most central part of the picture.

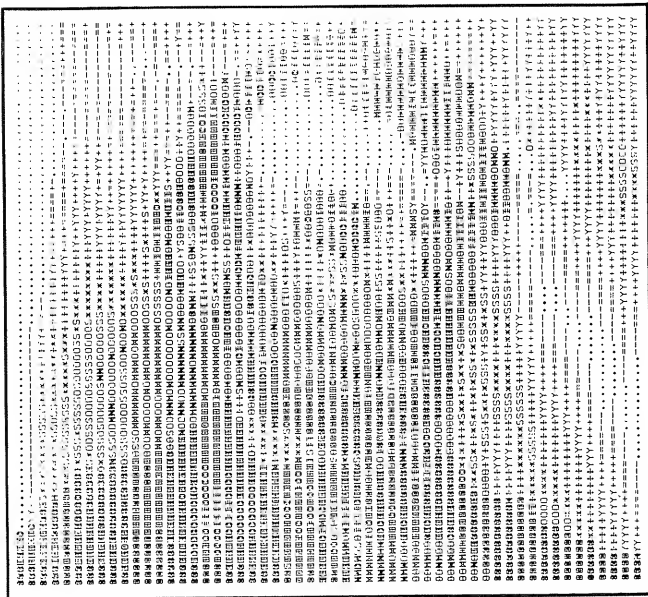
To summarize, first take a black and white slide picture of your subject. Adjust the pot on your reading table. Then project the slide onto the ground glass and



read the picture using the analog-80 system and program setup/AUT. Print the picture using PRINTIT and examine your artwork. If you need to enhance it, use ENHANCE/LIN, or devise your own enhancement and reprint the enhanced picture using PRINTIT. Sometimes, I enhance a picture several times to get just the right shading or highlighting.

*Ed note: *Analog-80 sells for \$139 and is available for Models I and III. The Model III version also requires a bus converter for an additional \$39.95. For more information, contact Alpha Products, 79-04 Jamaica Ave., Woodhaven, NY 11421, or phone (212) 296-5916.*

Figure 9



Listing 1 — PRINTIT

```

10 ***** PRINTIT *****
100 CLS
110 CLEAR10000
120 DIM SHADE$(2),P$(64)
130 SHADE$(1)=" ..--==++YY:I*SOWOOHIOIHH
O"
140 SHADE$(2)=" . - = + .- M--+=:**I
*"
150 CODE$="ABCDEFGHILJKLMNPOQRSTUVWXYZ"
160 INPUT"ENTER PICTURE NAME";PN$
170 INPUT"ENTER VERTICAL SCALE FACTOR (6
IS NORMAL)";FV
180 INPUT"ENTER HORIZONTAL SCALE FACTOR
(1.25 IS NORMAL)";FH
190 MX=64*FH
200 FH=1/FH
210 INPUT"ENTER PIXEL SIZE";PS
220 INPUT"HOW MANY SHADES";NS
230 INPUT"POSITION PAPER AND <ENTER>";Z
240 PRINT"*** READ AND VERT SCALE ***";
250 OPEN"I",1,PN$

```

```

260 FOR I=1 TO 64
270 PRINT@418,"ROW ";I
280 IF FV=0 THEN 340
290 IF INT(I/FV)*FV<>I THEN 340 ' K
EEP THIS ONE
300 SK=SK+1 ' N
UMBER SKIPPED
310 PRINT@438,"SKIP";SK
320 INPUT#1, P$ ' S
KIP THIS ONE
330 GOTO 350 ' G
ET NEXT ONE
340 INPUT#1, P$(I-SK) ' T
HIS ONE'S OK
350 NEXT I
360 CLOSE 1
370 MY=64-SK ' N
UMBER OF ROWS
380 PRINT" "
390 P$=STRING$(MX," ") ' M
AKE A BLANK LINE
400 IF FH =1 THEN 520
410 PRINT@448, "*** HORIZONTAL SCALING *
**";
420 FOR J=1 TO MY ' T
HERE ARE MY ROWS
430 FOR K=1 TO MX '
THERE ARE MX COLUMNS
440 PRINT@482,"ROW ";J;" COLUMN ";K
450 KK=INT(K*FH) '
SCALE IT
460 IF KK<1 THEN KK=1 '
KEEP IT >1
470 B$=MID$(P$(J),KK,1) '
GET ONE CODE
480 MID$(P$,K,1)=B$ '
PUT ITS CODE IN P$
490 NEXT K '
NEXT COL
500 P$(J)=P$ '
SAVE IN ARRAY
510 NEXT J ' N
EXT ROW
520 IF PS=1 THEN 690
530 PRINT@512, "*** PIXEL SIZING ***";
540 FOR I=1 TO MY-PS STEP PS ' F
OR EACH ROW
550 FOR J=1 TO MX-PS STEP PS '
FOR EACH COLUMN
560 PRINT@546,"ROW ";I;"COLUMN";J;
570 N=0
580 FOR K=I TO PS+I-1 '
GET PIXEL ON EACH SIDE
590 FOR L=J TO PS+J-1
600 PRINT@500,L;K
610 N=N+ASC(MID$(P$(K),L,1)) '
ADD UP CODES

```

Pictures

```

620 NEXT L,K
630 N=N/(PS*PS)'
      DIVIDE BY PIXEL [2
640 FOR K=I TO PS+I-1'
      PUT BACK
650 FOR L=J TO PS+J-1'
      INTO
660 MID$(P$(K),L,1)=CHR$(N)'
      P$
670 NEXT L,K,J,I'
      DO REST
680 '
** PRINTING ROUTINE ***
690 FOR I=1 TO 2'
      WO SHADES
700 FOR J=1 TO MY'
      MY ROWS
710 FOR K=1 TO MX'
      MX CHARACTERS
720 N=INSTR(CODE$,MID$(P$(J),K,1))'
      ITS NUMBER
730 N=INT(26/(NS-1)*(INT(NS*N/26))+1)'
      GREY SCALE
740 IF N>26 THEN N=26'
      KEEP IT < 26
750 MID$(P$,K,1)=MID$(SHADE$(I),N,1)'
      PUT INTO OUTPUT LINE
760 NEXT K'
      NEXT CHARACTER
770 LPRINT P$
780 NEXT J'
      NEXT ROW
790 INPUT"REPOSITION PAPER AND <ENTER>";
X
800 NEXT I'
EXT SHADE
810 STOP

```

Listing 2 — SETUP/MAN

```

100 '***** SETUP/MAN *****
110 CLEAR 10000
120 CLS
130 INPUT"ENTER SAVE FILE NAME";FD$
140 OPEN "O",1,FD$
150 FOR I=1 TO 64'
      64 ROWS
160 READ A$'
      GE
T ONE ROW
170 PRINT A$'
      SH
OW HUMAN
180 PRINT #1,A$'
      SA
VE IT
190 NEXT I'
      DO RE
ST OF 'EM
200 DATA:'HERE IS
210 DATA:' I PUT

```

20 Basic Computing

```

220 DATA:'      64 ROWS
230 DATA:'      OF CODES

```

Listing 3 — ADJUST

```

100 '***** ADJUST *****
110 CLS
120 PRINT@64, "POINT TO BRIGHT SPOT AND
<ENTER>";
130 INPUT A$
140 OUT 0,1
150 A=INP(0)
160 PRINT@128,"POINT TO DARK SPOT AND <E
NTER>";
170 INPUT A$
180 OUT 0,1
190 B=INP(0)
200 PRINT @ 192, "LIGHT = ";A,"DARK = ";
B,"DIFFERENCE = ";B-A
210 INPUT "DO IT AGAIN <Y> OR <N>";A$
220 IF A$="N" THEN STOP
230 INPUT "READJUST POT AND <ENTER>";A$
240 GOTO 110

```

Listing 4 — SETUP/AUT

```

100 '***** SETUP/AUT *****
110 CLEAR 10000
120 DIM A$(64)
130 CODE$="ABCDEFGHIJKLMNOPQRSTUVWXYZ"
140 FOR I=1 TO 64'
      HERE COME THE ROWS
150 CLS
160 L$=""
170 PRINT @ 320,L$
180 PRINT @ 55,"ROW=";I;
190 FOR J=1 TO 64'
      AND THE CHARACTERS
200 PRINT @ 119,"COL=";J;
210 IF INKEY$=""THEN 210 '
      WAIT FOR INPUT
220 OUT 0,1'
      GET ANALOG-80 READY
230 A=INP(0)'
      GET ITS RESULT
240 A=INT((A+5)/10)
250 IF A<1 THEN A=1'
      DON'T LET IT GET SMALL
260 A$=MID$(CODE$,A,1)'
      GET THE LETTER
270 L$=L$+A$'
      ADD IT TO STRING
280 PRINT @ 320,L$;
290 NEXT J'
      GET ANOTHER
300 INPUT "<N> IF NOT OK ELSE <Y>";B$
310 IF B$="Y" THEN 330

```

```

320 GOTO 150 '
TRY AGAIN
330 A$(I)=L$'
SAVE IT THEN
340 NEXT I'
NEXT ROW
350 INPUT"ENTER SAVE FILE NAME";FD$' WH
ERE'S IT TO GO?
360 OPEN "O",1,FD$
370 FOR I=1 TO 64
380 PRINT#1,A$(I)'
    SAVE IT
390 NEXT I'
    FINISH UP
400 CLOSE

```

```

160 OPEN"I",1,FD$'
    OPEN IT
170 FOR I=1 TO 64'
    READ
180 INPUT#1,A$(I)'
    IN
190 NEXT I'
    PICTURE
200 CLOSE
210 DIM FC(26)'
FREQ. COUNT FOR SHADES
220 FOR I=1 TO 64'
DO ALL ROWS
230 PRINT@192,"ROW ";I'
    PRINT ROW NUMBER
240 PRINT@256,A$(I);'
    PRINT ROW
250 FOR J=1 TO 64'
DO ALL CHARACTERS
260 A$=MID$(A$(I),J,1)'
    GET ONE CHARACTER
270 A=ASC(A$)-64'
    GET ITS NUMERIC SHADE
280 PRINT@319+J,CHR$(91)'
    MOVE THE ARROW

```

Listing 5 — ENHANCE/LIN

```

100 ***** ENHANCE/LIN *****
110 MX=0
120 CLS
130 CLEAR 10000
140 DIM A$(64),P$(26,50)
150 INPUT"WHICH FILE IS TO BE WORKED ON"
;FD$

```

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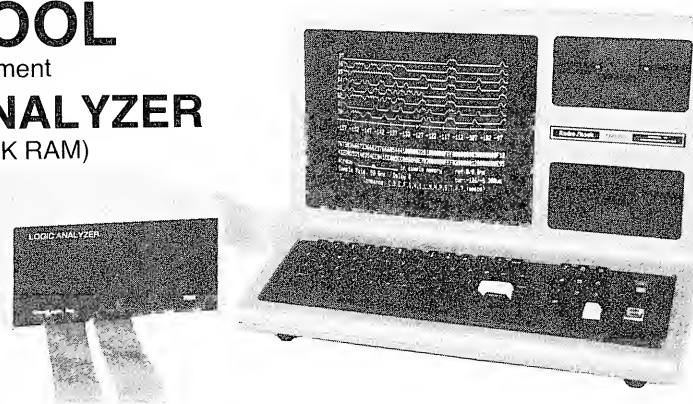
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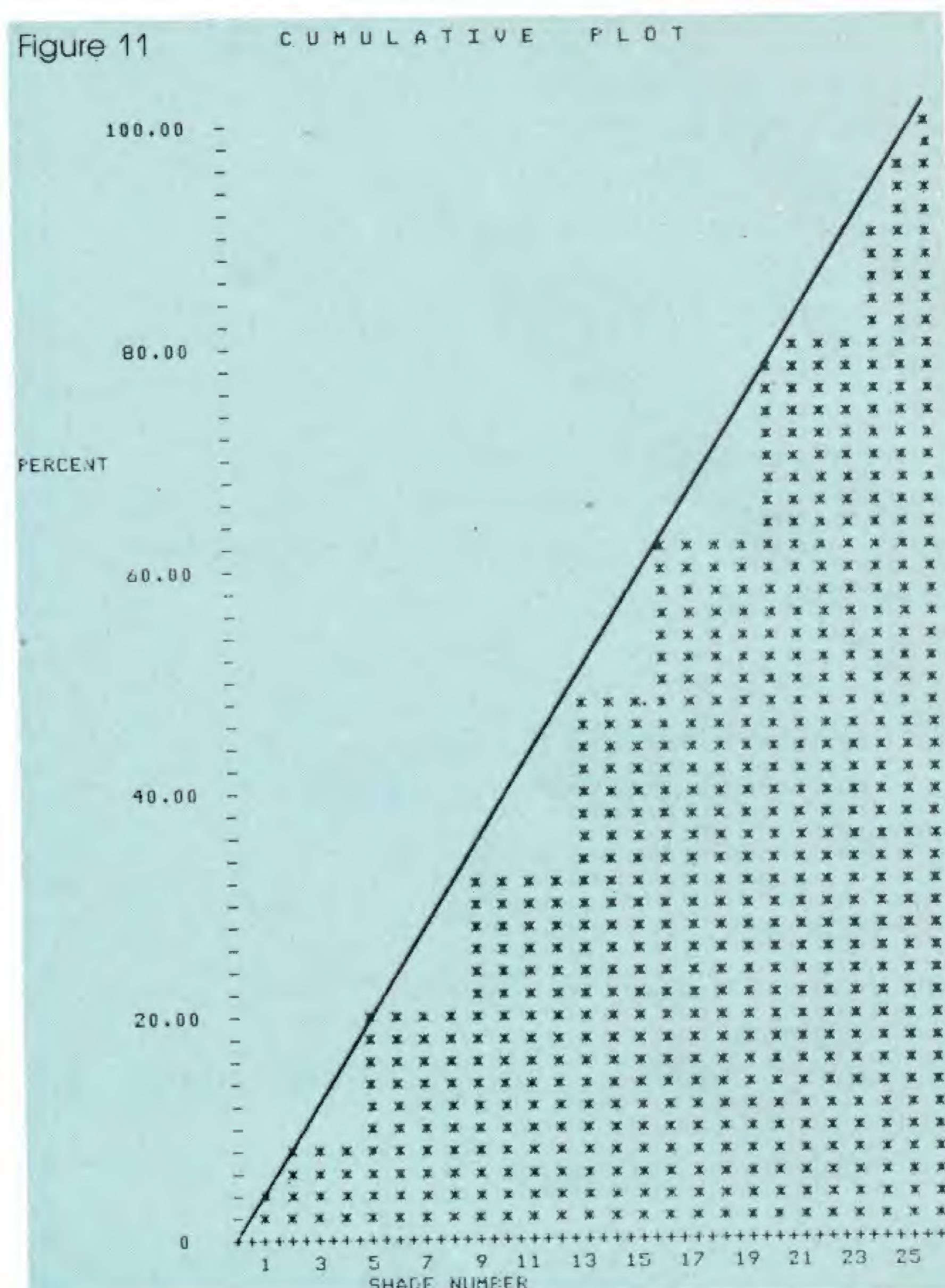
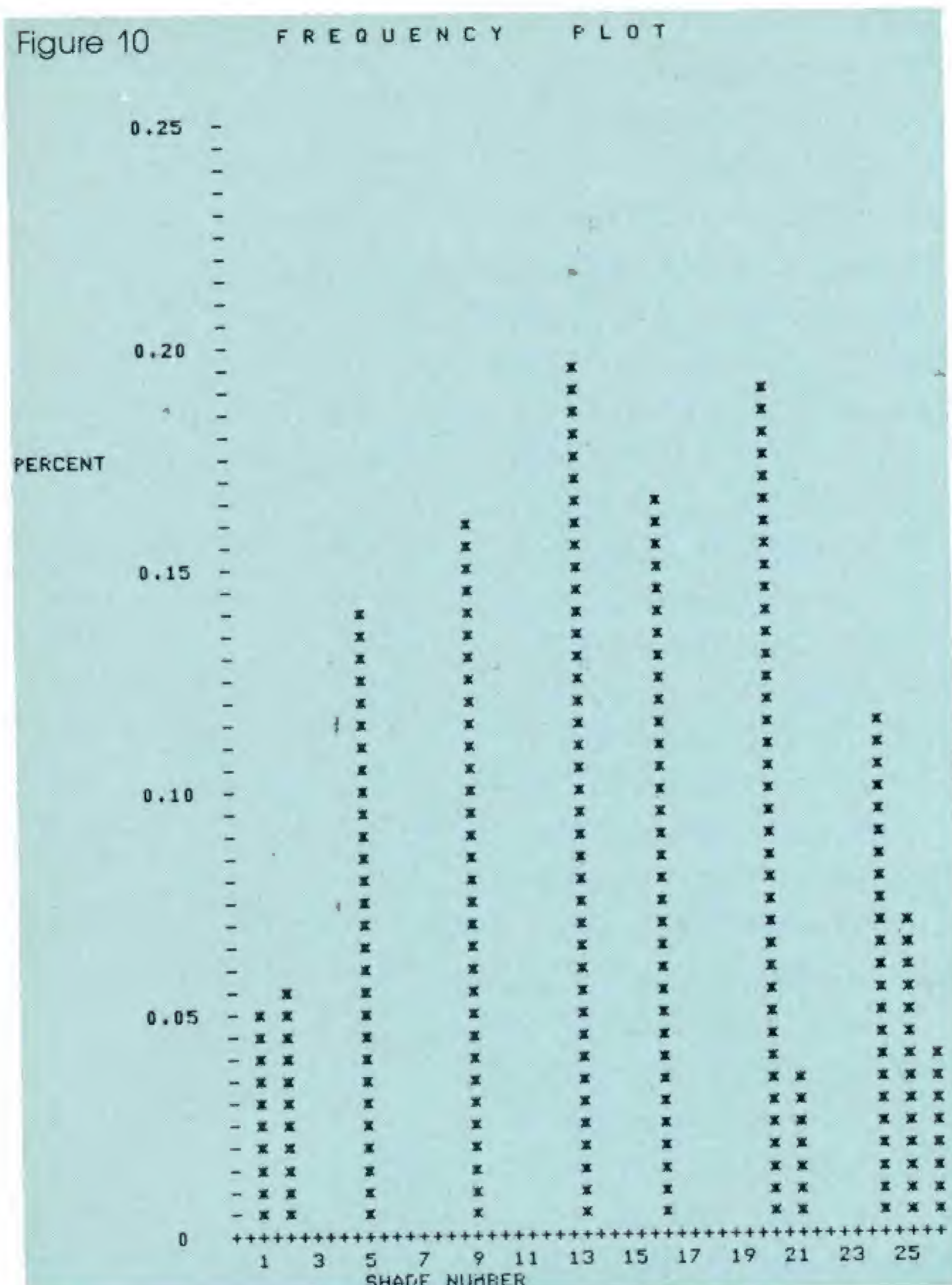
Pictures

```

290 FC(A)=FC(A)+1'
  ADD 1 TO THIS SHADE
300 PRINT@319+J," "
  REMOVE LAST ARROW
310 NEXT J,I'
  DO REST OF PICTURE
320 FOR I=1 TO 26'
SCALE
330 FC(I)=FC(I)/4096'
  TO
340 IF FC(I)>MX THEN MX=FC(I)'
  (CHECK SCALE)
350 NEXT I'
  FULL SIZE
360 TT$="F R E Q U E N C Y      P L O T"
370 FX=250:FY=.005
380 IF MX>.5 THEN FX=50: FY=.02'
  ADJUST FOR SCALING
390 GOSUB 700
400 FOR I=1 TO 26'
MAKE A
410 FC(I)=FC(I)+FC(I-1)'
  RUNNING TOTAL
420 NEXT I'
  OF FREQUENCIES
430 TT$="C U M U L A T I V E      P L O T"
440 FX=50:FY=2
450 GOSUB 700
460 '
***** LINEAR *****
470 FOR I=1 TO 26'
ADJUST
480 FC(I)=INT(FC(I)*26+.5)'
  THE
490 NEXT I'
  FREQUENCY
500 '
*** ADJUST PICTURE ***
510 FOR I=1 TO 64'
DO EVERY ROW
520 PRINT@192,"ROW ";I'
  SHOW HUMAN
530 FOR J=1 TO 64'
  DO EVERY CHARACTER
540 PRINT@320,STRING$(64," ")'
  ERASE LAST ARROW
550 PRINT@256,A$(I)'
  SHOW HUMAN
560 A$=MID$(A$(I),J,1)'
  GET ONE CHARACTER
570 A=ASC(A$)-64'
  GET NUMERIC SHADE
580 A=INT(FC(A))'
  ADJUSTED SHADE
590 MID$(A$(I),J,1)=CHR$(A+64)'
  PUT IT BACK
600 PRINT@319+J,CHR$(91)'

      MOVE ARROW
610 NEXT J,I'
FINISH UP
620 INPUT"ENTER SAVE FILE NAME";FD$
630 OPEN "O",1,FD$'
OPEN SAVE FILE
640 FOR I=1 TO 64'
DO EVERY ROW
650 PRINT#1,A$(I)'
  SAVE IT
660 NEXT I'
FINISH UP
670 CLOSE
680 IF YN$="P" THEN RUN "PICTURES"
690 STOP
700 LPRINT CHR$(12)'
*** PLOT ROUTINE ***
710 LPRINT " ":LPRINT" "
720 LPRINT TAB(20);TT$'
TITLE
730 LPRINT TAB(25);FD$
740 LPRINT" ":LPRINT" "
750 FOR I=1 TO 26'
CLEAR
760 FOR J=1 TO 50'
  OUT
770 P$(I,J)=" "'
  PLOT
780 NEXT J,I'
  SPACE
790 FOR I=1 TO 26'
FILL
800 IF FC(I)=0 THEN 840 '
  (SKIP IF ZERO)
810 FOR J=1 TO FC(I)*FX'
  THE
820 P$(I,J)=" *"'
  PLOT
830 NEXT J
840 NEXT I
850 FOR J=50 TO 1 STEP-1'
  PRINT THE PLOT
860 IF J=35 THEN LPRINT "PERCENT";'
  SCALE NAME
870 IF INT(J/10)*10<>J THEN 890
880 LPRINT TAB(7) USING "###.## " ;J*FY;
  PRINT SCALE
890 LPRINT TAB(15);"-";
900 FOR I=1 TO 26'
THESE THREE
910 LPRINT P$(I,J);'
  LINES PRINT
920 NEXT I'
  THE PLOT
930 IF J<>0 THEN LPRINT " "
940 NEXT J
950 LPRINT TAB(11);"0 " ;

```



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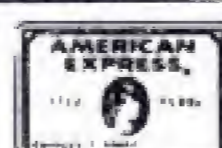
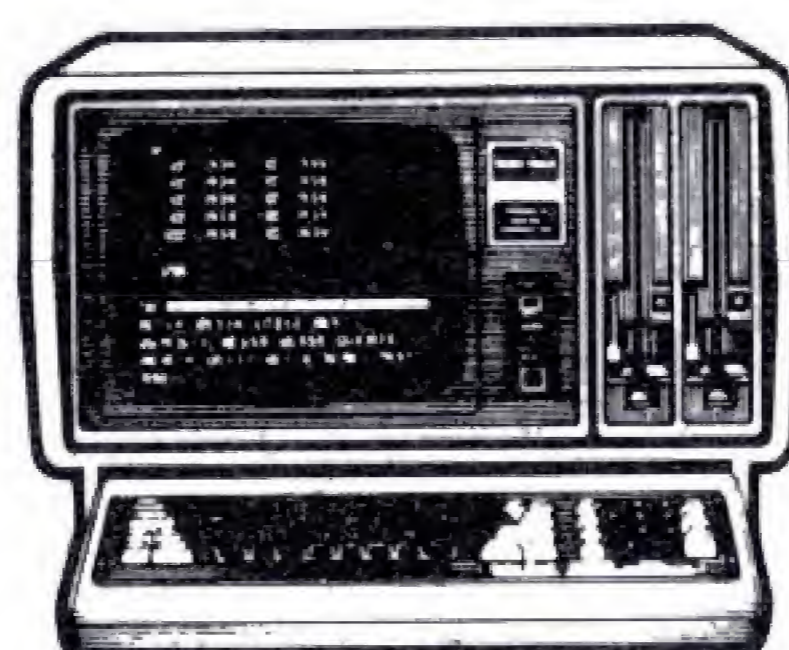
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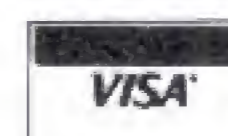
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```

960 LPRINT STRING$(53, "+") '
UT ON BOTTOM LINE
970 LPRINT TAB(16);
980 FOR I=1 TO 26 STEP 2'
HESE LINES
990 LPRINT USING "## "; I; '
PUT ON
1000 NEXT I'
BOTTOM SCALE
1010 LPRINT " "
1020 LPRINT TAB(25) "SHADE NUMBER"
1030 RETURN

```

Listing 6 — ENHANCE/EDG

```

100 '***** ENHANCE/EDG *****
110 CLS
120 CLEAR 10000
130 DIM A$(64)
140 L1$=STRING$(64, "Z")
150 L2$=L1$
160 INPUT"WHICH FILE IS TO BE WORKED ON"
;FD$
170 OPEN"I", 1, FD$ '
OPEN IT
180 FOR I=1 TO 64'
READ
190 INPUT#1, A$(I) '
IN
200 NEXT I'
PICTURE
210 CLOSE
220 INPUT"ENTER THE THRESHOLD VALUE (1 T
O 26)"; T
230 CLS
240 PRINT @ 183, "T="; STRING$(1, 64+T);
260 SY=38/64'

```



```

P SCALE TUBE PICTURE
270 FOR I=2 TO 63'
DO ALL ROWS
T 280 FOR J=2 TO 63'
DO ALL CHARACTERS
290 PRINT @ 55, "ROW="; I;
300 PRINT @ 119, "COL="; J;
310 A$=MID$(A$(I), J, 1) '
GET ONE CHARACTER
320 X0=ASC(A$)-64 '
330 PRINT @ 380, A$;
340 A$=MID$(A$(I), J+1, 1) '
GET ONE ON RIGHT
350 PRINT @ 382, A$;
360 XR=ASC(A$)-64
370 A$=MID$(A$(I), J-1, 1) '
GET ONE ON LEFT
380 PRINT @ 378, A$;
390 XL=ASC(A$)-64
400 A$=MID$(A$(I-1), J, 1) '
GET ONE ABOVE
410 PRINT @ 316, A$;
420 XA=ASC(A$)-64
430 A$=MID$(A$(I+1), J, 1) '
GET ONE BELOW
440 PRINT @ 444, A$;
450 XB=ASC(A$)-64
460 S$="@ "
470 IF (X0>T AND XR<T)
OR (X0<T AND XR>T)
OR (X0>T AND XL<T)
OR (X0<T AND XL>T)
OR (X0>T AND XA<T)
OR (X0<T AND XA>T)
OR (X0>T AND XB<T)
OR (X0<T AND XB>T)
THEN S$="Z":SET(I*SX, 47-J*SY)
480 MID$(L1$, J, 1)=S$ '
PUT INTO DUMMY PICTURE
490 NEXT J' N
EXT CHARACTER
500 A$(I-1)=L2$ '
COPY TO REAL PICTURE
510 L2$=L1$ '
SAVE FOR NEXT TIME
520 NEXT I' N
EXT ROW
530 PRINT @ 0, " ";
540 INPUT"ENTER SAVE FILE NAME"; FD$ ' WH
ERE'S IT TO GO?
550 OPEN "O", 1, FD$+"/EDG"
560 FOR I=1 TO 64
570 PRINT#1, A$(I) '
SAVE IT
580 NEXT I'
FINISH UP
590 CLOSE

```

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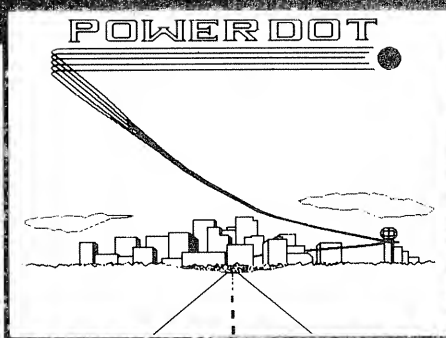
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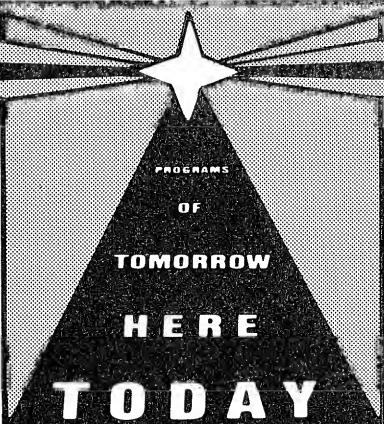


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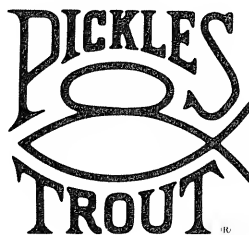
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Setting print

Models I/III

Jack Hines

Tuscaloosa, AL

Well, I'm ready to
write my article. Let's
see, load the word
processor and . . .
STOP! The printer is in
the wrong print
mode! I'm in DOS
now, so first go to
BASIC. Then LPRINT
CHR\$(27) for escape
and then CHR\$(. . .
Now, where did I
put that command
code summary?

and your printer

er modes from DOS

If this has ever happened to you, this program is what you need! The program in Listing 1 is designed to read a line of commands, interpret them into printer command codes and send them to the printer without having to leave DOS.

Program Operation

After entering and assembling the program in Listing 1, all you need to set the printer from DOS is type, PRINTER C8, and zap, the printer is set to condensed mode, eight lines per inch. Say you want to print a heading before doing a DIR P. Just type PRINTER "Directory as of 3/1/82." "Games 0A." and the printer will print it out right from DOS. The program in Listing 1 is written for a Radio Shack Line Printer VI, but the parameters can be easily changed to work with your printer.

On entry, the program first checks the DOS input buffer located at 4318H for a space immediately following the command. This space *must* be present to separate the command from the parameters for the printer. If no space is present the program exits via the DOS error routine at 4409H setting the error to PARAMETER ERROR. The parameter list need contain no spaces, as the portion that sets the parameters into the print buffer will ignore any spaces or characters that are not valid parameters.

Upon finding the required space the program then converts the parameter list into printer commands and stores them in a print buffer.

C sets the printer to condensed

mode. X clears the condensed mode. E starts the elongated print and Z clears the elongated mode. 2 sets the vertical spacing to 12 lines per inch. 6 sets the vertical spacing to six lines per inch. 8 sets the vertical spacing to eight lines per inch.

When a " is encountered the program then stores all characters following the " into the print buffer until a second ", an ENTER (0DH) character or a BREAK (01) character is encountered. This means that the command PRINTER "PRINT THIS <CR>, is perfectly

legal and the string PRINT THIS will be sent to the printer. All strings printed from this program will be in uppercase because the DOS command decoder first goes through the input buffer and converts all lowercase characters to uppercase.

There are two parameters not associated with the printer operation that the program recognizes. The first is the M parameter. When the M is encountered the only action that is taken immediately is the flag at line

Program Listing for Printer/Command

```
00100 ;Printer/Cmd Ver 1.6
00200 ; Sets the printer according to the following parameters:
00300 ;      C — Sets printer to condensed mode
00400 ;      X — Clears condensed mode
00500 ;      E — Starts elongated mode
00600 ;      Z — Ends elongated mode
00700 ;      2 — Sets printer to 12 lines per inch
00800 ;      8 — Sets printer to 8 lines per inch
00900 ;      6 — Sets printer to 6 lines per inch
01000 ;      " — Will print all characters until the next
01100 ;           ", 01 (break) or 0D (enter)
01200 ;      M — Clears memory from 5200 to HIMEM
01300 ;      D — Adds interrupt routine to display date
01400 ;
4318      01500 DOSBUF EQU      4318H      ;DOS Command buffer
5200      01600      ORG      5200H      ;First user memory area
5200 00      01700 FLAG DEFEB 0          ;Clear memory flag
5201 211843 01800 START LD      HL,DOSBUF ;Point to command area
5204 114C53      LD      DE,PBUF      ;Print buffer area
5207 3E20      02000 LOOP LD      A,20H ;Space
5209 BE      02100      CP      (HL)    ;Is character a space
520A 280F      02200      JR      Z,CONT ;Go if it is
520C 3E0D      02300      LD      A,0DH ;Is character a CR
520E BE      02400      CP      (HL)    ;Check character
520F CA1453 02500      JP      Z,ERROR  ;CR shouldn't be here
5212 3E01      02600      LD      A,01H ;Break
5214 BE      02700      CP      (HL)    ;Check character
5215 CA1453 02800      JP      Z,ERROR  ;Break shouldn't be here
5218 23      02900      INC      HL      ;Go to next character
5219 18EC      03000      JR      LOOP  ;Check until match found
521B 23      03100 CONT INC      HL      ;Point to next character
521C 7E      03200      LD      A,(HL)   ;Get the character
521D FE0D      03300      CP      0DH    ;Command end marker (CR)
521F CAA652 03400      JP      Z,EXIT   ;All done so exit
```

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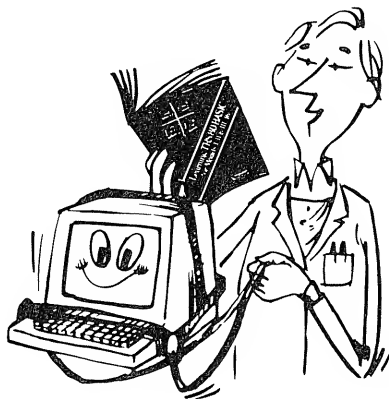
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1800 is set. When the program is ready to exit, this flag will be checked.

The second parameter not associated with the printer is the D parameter. The D parameter causes the short routine at line 18100 to be relocated from the current HIMEM down. HIMEM is then reset to protect the new routine and it is then inserted into the interrupt chain. The routine is very short (11 bytes), and causes the date to be displayed in the upper right hand corner of the screen, directly below the time.

DOS Calls

The operating system I am using is NEWDOS/80 version 2. The NEWDOS/80 version 2 manual gives many of the calls needed to fully utilize the operating system. I have used the calls to 4410H, 4409H and 4470H as well as the exit to 402DH.

The call to 4410H inserts a user routine into the interrupt chain. The requirements are that the DE register pair contain the starting address of the routine to be inserted. The routine must begin with two bytes of zeros to be used by DOS as a forward chain pointer. The third byte of the routine is the number of interrupts to pass between executions of this routine. The fourth byte is the count of interrupts and initially must be non-zero.

The call to 4409H will display the error corresponding to the error code in the A register. If bit 7 of the A register is 0 this routine will exit to 402DH. If bit 7 of the A register is 1 the routine will return to the caller.

The call to 4470H converts the date to MM/DD/YY format. The HL register pair must point an 8-byte area where the converted date will be stored. In this program I point HL at the screen position where I want the date displayed. The jump to 402DH is the exit to DOS READY.

When the program is through with the command line, it jumps to EXIT at line 9500. The last bit of housekeeping is done here.

The end of the print buffer is marked with a zero byte. Then a call is made to the printer routine at line 12000 and the print buffer is sent to the printer.

On return to the EXIT routine the flag at line 1800 is checked. If the

flag at line 1800 is set, the program then falls through to CLMEM at line 10100. CLMEM moves the short section (22 bytes) CLM down to 5200H and then jumps to that routine.

Once CLM is relocated it loads the HIMEM value at 4049H into the HL register pair. Using this value as the upper limit, CLM clears all memory from 5200H+22 to HIMEM.

At first glance, those of you who are using NEWDOS/80 version 2, may say that the DOS command CLEAR will do the same thing, and it will . . . almost.

The CLEAR command clears all memory from 5200H to FFFFH, purges the interrupt chain and clears all ROUTing. The parameters for the CLEAR command may selectively clear memory from a starting address to an ending address but your ROUTing is still purged. PRINTER M does none of this and leaves routines in high memory alone.

Conversion

To convert the print commands to suit your printer will require some simple revision of the program. The interpretation of the parameter list for the printer starts at line 4200 and continues through line 8600.

To change a command character from C for condensed to S for small, find the line that compares that character (line 4200) and change the C to S.

To change the codes that will be sent to the printer, first find that command (i.e., line 4200). Then, if the code you wish to insert is the same number of bytes as the present code, simply change the value to be loaded into the A register (i.e., line 4400).

If the number of bytes for the control code are greater than the number of bytes already in the sequence, then insert the code:

```
LD A,value
CALL LOAD
```

between the last call to LOAD (i.e., line 4700) and the jump relative to CONT (i.e., line 4800).

With a few changes to the program, you can set your printer to any of its print modes directly from DOS and save the annoyance of having to go to BASIC to set the printer.

5222	FE01	03500	CP	01H	;Can also be end marker
5224	CAA652	03600	JP	Z,EXIT	;All done so exit
5227	FE22	03700	CP	'''	;Literal string print
5229	CCF052	03800	CALL	Z,STRING	;Go to string-print
522C	FE44	03900	CP	'D'	;Date flag
522E	CC1953	04000	CALL	Z,BEGIN	;Add date to chain
5231	FE43	04100	CP	'C'	;Condensed mode flag
5233	200C	04200	JR	NZ,CONT1	;Go if no match
5235	3E1B	04300	LD	A,1BH	;Escape character
5237	CDA352	04400	CALL	LOAD	;Put in print buffer
523A	3E0E	04500	LD	A,0EH	;Condense command
523C	CDA352	04600	CALL	LOAD	;Put in print buffer
523F	18DA	04700	JR	CONT	;Go for next character
5241	FE58	04800	CP	'X'	;End condensed mode flag
5243	200C	04900	JR	NZ,CONT2	;Go if no match
5245	3E1B	05000	LD	A,1BH	;Escape character
5247	CDA352	05100	CALL	LOAD	;Put in print buffer
524A	3E0F	05200	LD	A,0FH	;End condense character
524C	CDA352	05300	CALL	LOAD	;Put in print buffer
524F	28CA	05400	JR	Z,CONT	;Go for next character
5251	FE5A	05500	CP	'Z'	;Cancel elongated mode
5253	2007	05600	JR	NZ,CONT3	;Go if no match
5255	3E1E	05700	LD	A,1EH	;Cancel elongate mode
5257	CDA352	05800	CALL	LOAD	;Put in buffer
525A	18BF	05900	JR	CONT	;Go for next character
525C	FE45	06000	CP	'E'	;Start elongate mode
525E	2007	06100	JR	NZ,CONT4	;Go if no match
5260	3E1F	06200	LD	A,1FH	;Start elongate code
5262	CDA352	06300	CALL	LOAD	;Put in buffer
5265	18B4	06400	JR	CONT	;Go for next character
5267	FE32	06500	CP	'2'	;12 lines/inch
5269	200C	06600	JR	NZ,CONT5	;Go if no match
526B	3E1B	06700	LD	A,1BH	;Escape code required
526D	CDA352	06800	CALL	LOAD	;Put in buffer
5270	3E1C	06900	LD	A,1CH	;12 lines/inch mode
5272	CDA352	07000	CALL	LOAD	;Put in buffer
5275	18A4	07100	JR	CONT	;Next character
5277	FE36	07200	CP	'6'	;6 lines/inch mode
5279	200C	07300	JR	NZ,CONT6	;Go if no match
527B	3E1B	07400	LD	A,1BH	;Escape code required
527D	CDA352	07500	CALL	LOAD	;Put in buffer
5280	3E36	07600	LD	A,36H	;6 lines/inch mode
5282	CDA352	07700	CALL	LOAD	;Put in buffer
5285	1894	07800	JR	CONT	;Next character
5287	FE38	07900	CP	'8'	;8 lines/inch
5289	200C	08000	JR	NZ,CONT7	;Go if no match
528B	3E1B	08100	LD	A,1BH	;Escape code required
528D	CDA352	08200	CALL	LOAD	;Put in buffer
5290	3E38	08300	LD	A,38H	;8 lines/inch mode
5292	CDA352	08400	CALL	LOAD	;Put in buffer
5295	1884	08500	JR	CONT	;Next character
5297	FE4D	08600	CP	'M'	;Clear memory
5299	2080	08700	JR	NZ,CONT	;Go if no match
529B	3E01	08800	LD	A,1	;Clear flag on
529D	320052	08900	LD	(FLAG),A	;Set flag on
52A0	C31B52	09000	JP	CONT	;Go for next character
52A3	12	09100	LD	(DE),A	;Store chr. in buffer
52A4	13	09200	INC	DE	;Bump buffer pointer
52A5	C9	09300	RET		;Back to caller
52A6	3E00	09400	LD	A,0	;Buffer end marker
52A8	CDA352	09500	CALL	LOAD	;Store in buffer
52AB	CDB52	09600	CALL	PRINT	;Send buffer to printer
52AE	3A0052	09700	LD	A,(FLAG)	;Check for clear memory
52B1	FE00	09800	CP	0	;Is flag off
52B3	CA2D40	09900	JP	Z,402DH	;Yes--return to DOS
52B6	110052	10000	LD	DE,5200H	;Move routine to 5200H
52B9	21C452	10100	LD	HL,CLM	;Point to routine
52BC	011600	10200	LD	BC,ENDCLM-CLM	;Figure number to move
52BF	EDB0	10300	LDIR		;Move routine to 5200H
52C1	C30052	10400	JP	5200H	;Go to routine
52C4	2A4940	10500	LD	HL,(4049H)	;Get Himem location
52C7	111652	10600	LD	DE,ENDCLM-CLM+5200H	;Do some math
52CA	AF	10700	XOR	A	;Clear carry flag
52CB	ED52	10800	SBC	HL,DE	;Figure #/bytes to clear
52CD	E5	10900	PUSH	HL	;Move HL
52CE	C1	11000	POP	BC	; to BC (#/bytes/clear)
52CF	D5	11100	PUSH	DE	;Start is moved to HL
52D0	E1	11200	POP	HL	;HL now has start

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Command

52D1 13	11300	INC	DE	;DE now has destination
52D2 3E00	11400	LD	A,0	;Fill byte
52D4 77	11500	LD	(HL),A	;Fill source byte
52D5 EDB0	11600	LDIR		;Clear mem (5200 - Himem)
52D7 C32D40	11700	JP	402DH	;Return to DOS
52DA 00	11800	ENDCLM	NOP	;Spot end of CLM
52DB 214C53	11900	PRINT	LD	HL,PBUF
52DE 7E	12000	PRINT1	LD	A,(HL)
52DF FE00	12100	CP	0	;Get a character
52E1 C8	12200	RET	Z	;Check for end marker
52E2 D9	12300	EXX		;Go if end found
52E3 21E837	12400	LD	HL,37E8H	;Use alternate registers
52E6 56	12500	LOOP2	LD	D,(HL)
52E7 CB7A	12600	BIT	7,D	;Point to printer port
52E9 20FB	12700	JR	NZ,LOOP2	;Get port status
52EB 77	12800	LD	(HL),A	;Check for ready status
52EC D9	12900	EXX		;Not ready, try again
52ED 23	13000	INC	HL	;Ready, send character
52EE 18EE	13100	JR	PRINT1	;Back to normal registers
52F0 23	13200	STRING	INC	HL
52F1 7E	13300	LD	A,(HL)	;Bump buffer pointer
52F2 FE0D	13400	CP	0DH	;Go for another character
52F4 281D	13500	JR	Z,ERRSTR	;Bump command pointer
52F6 FE01	13600	CP	01H	;Get a character
52F8 2819	13700	JR	Z,ERRSTR	;Check for error
52FA 7E	13800	STR1	LD	A,(HL)
52FB FE0D	13900	CP	0DH	;Go if parameter error
52FD 280E	14000	JR	Z,OUT	;Check for BREAK
52FF FE01	14100	CP	01H	;Go if parameter error
5301 280A	14200	JR	Z,OUT	;Get character
5303 FE22	14300	CP	01H	;Check for cr
5305 2806	14400	JR	Z,OUT	;Go if match
5307 CDA352	14500	CALL	LOAD	;Check for BREAK
530A 23	14600	INC	HL	;Go if match
530B 18ED	14700	JR	STR1	;End string marker
530D 3E0D	14800	OUT	LD	A,0DH
530F CDA352	14900	CALL	LOAD	;Go for next character
5312 C9	15000	RET		;Put a carriage return
5313 C1	15100	ERRSTR	POP	BC
5314 3E2F	15200	ERROR	LD	A,2FH
5316 C30944	15300	JP	4409H	;Back to main program
4470	15400	DATE	EQU	4470H
4410	15500	ADTASK	EQU	4410H
4049	15600	HIMEM	EQU	4049H
5319 F5	15700	BEGIN	PUSH	AF
531A C5	15800	PUSH	BC	;Save A and Flags
531B D5	15900	PUSH	DE	;Save Byte counter
531C E5	16000	PUSH	HL	;Save Destination pointer
531D 2A4940	16100	LD	HL,(HIMEM)	;Save Source pointer
5320 110B00	16200	LD	DE,LAST-START1	;Get high pointer
5323 AF	16300	XOR	A	;Legnth of routine
5324 ED52	16400	SBC	HL,DE	;Clear carry
5326 2B	16500	DEC	HL	;New himem address+1
5327 224940	16600	LD	(HIMEM),HL	;HL now has himem
532A 23	16700	INC	HL	;Store it
532B EB	16800	EX	DE,HL	;Start of routine
532C 010B00	16900	LD	BC,LAST-START1	;Set up the destination
532F 214153	17000	LD	HL,START1	;Length of routine
5332 EDB0	17100	LDIR		;Point to beginning
5334 ED5B4940	17200	LD	DE,(HIMEM)	;Move it in
5338 13	17300	INC	DE	;Get start -1
5339 CD1044	17400	CALL	ADTASK	;DE now has start
533C E1	17500	POP	HL	;Into interrupt chain
533D D1	17600	POP	DE	;Get Source pointer
533E C1	17700	POP	BC	;Get Destination pointer
533F F1	17800	POP	AF	;Get Byte counter
5340 C9	17900	RET		;Get A and Flags
5341 0000	18000	START1	DEFW	0
5343 28	18100	DEFB	40	;Return to main program
5344 01	18200	DEFB	1	;Forward chain pointer
5345 21753C	18300	LD	HL,3C75H	;Execute on 10th interrupt
5348 CD7044	18400	CALL	DATE	;Interrupt count
534B C9	18500	RET		;Point to screen posit
534C	18600	LAST	EQU	\$
534C 50	18700	PBUF	DEFM	'Print buffer here'
5201	18800	END		START
00000	TOTAL	ERRORS		

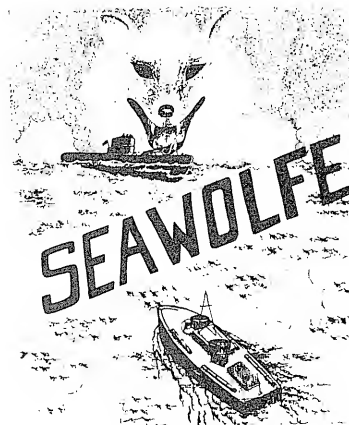
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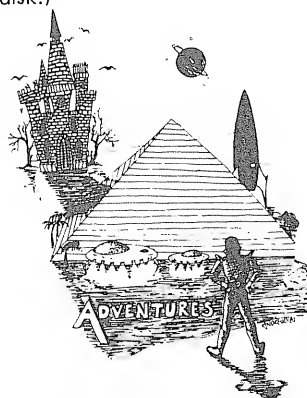
32K TRS 80 COLOR Version \$24.95.

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Hard-to-beat hardware.

The FX-80 has all the hardware features you've come to know and love on the MX Series: logic seeking, bidirectional printing, the by-now-famous disposable printhead, and more.

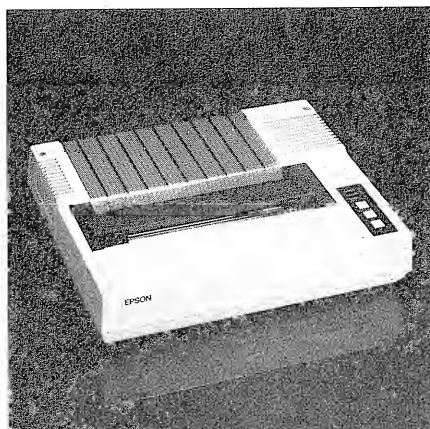
The FX-80 features an adjustable pin platen or optional friction/tractor feed, so you can use fanfold, roll or sheet paper ... backwards or forwards. The FX-80 even gives you reverse paper feed.

And if you're printing forms, the FX-80 has a feature you're gonna love: a function that allows you to tear off the paper within one inch of the last print position.

Be the first on your block.

We'd be willing to bet that the FX-80 — like the MX-80 — will have its share of imitators. Don't be fooled. To make sure you get the genuine article, rush down to your local computer store right now and let them show you everything the FX-80 can do.

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Word find

A picture search game

For all models

Patrick Morgan, Los Angeles, CA

My sons became interested in word search puzzles recently and I thought it would be great fun if they could make up their own puzzles. This seemed a perfect job for a computer. I saw a word search program some time ago, but had forgotten where. I looked through all the computer magazines I had, but couldn't find anything. I decided to write a program with the features I wanted.

This program creates a word search puzzle within several cartoon outlines of a 60 by 40 block. Because of its size, it is a rather difficult puzzle to solve. I, therefore, made provisions for an answer printout.

Since this type of program has a lot of dead time while creating matrices or placing words, I added indicators at several points to give the progress of the puzzle. These add very little time, but make it much more interesting, especially for children. It gives a feeling that the computer is doing something.

I ran this program for my son's class with each child's name hidden. Unfortunately, each child wanted his own copy and this got a little out of hand.

Program Details

First of all, note the CLEAR 5500 statement. This is because the program creates two 60 by 40 matrices plus a lot of other strings. The program won't fit into a 16K machine in this form, but it can easily be trimmed to fit. If you have the memory, why not use it?

First, the words are entered. A full matrix of this size can easily handle 50, or more, 10-letter words. The upper limit of 75 words was arbitrarily selected. The cartoons cut down the available word locations by about a third, so the capacity would be less. If more than 40 words are entered, I added a sort routine so that the longest words are placed first. This cuts down on the number of tries needed to place a word. Each pass through the sort is listed on the screen.

The next step is to create the 40 by 60 matrix in string memory. If the block was chosen, the matrix is created by ordinary nested FOR . . . NEXT loops. If a cartoon

was chosen, the procedure is a little more complicated and is covered in another section. This matrix is initially filled with dashes or spaces. I spent quite a bit of time trying to find a quick way of creating and filling the matrix with an assembly language subroutine, but I couldn't get the BASIC pointers to work.

When this matrix is finished, the program starts to fill it with words. Line 420 gets a random starting point (A and B) and a direction (D). Each direction has its own subroutine. The location is tested to see if there is enough room for the word and that it doesn't interfere with another word. If it is not okay, the program returns for a new starting point and direction. If it still won't fit after 100 tries, the word is skipped. The word, and the number of tries, is shown at the top of the screen so that you can follow along.

When all of the words are placed, a new matrix is created in which all words are located in the same place, but the dashes are replaced with random letters. The first matrix is kept as the answer and is printed on request. The second matrix is puzzle. If you are trying to conserve memory, skip the second matrix and fill the first with random letters.

The program, as it stands, is pretty well protected from a young user's standpoint. A non-number for "number of words" will cause a "redo" error message. The words may include numbers or punctuation, but a comma will cause an "extra ignored" error. This won't interfere with the run. The input will accept a word of up to 255 characters. This won't fit, of course, but no harm is done. These errors are easy to trap if you feel it necessary.

Cartoon Outline

The cartoon is created in lines 310 through 360 and the DATA statements. The procedure looks confusing, but is actually relatively straightforward. The DATA statements are alternately the number of spaces and dashes for each line. Each line must start with a space, but can end with either a space or a dash. I added a space in the

```

-----LICNEP-----
-----L-S-----
-----A-N-----F-----
-----TDO-----L-----
-----NNI-----U-----
-----EET-----O-----
-----N-A-----R-----
-----G-ECC-----E-----
-----R-THI-----S-----
-----P-NTN-----C-----
-----P-RO-U-----N-----
-----OC-M-----N-----
-----I-RADIOHACK-GR-M-----T-----
-----C-ENTHACAM-RE-O-----
-----SBOS JOURNAL-AT-C-----
TCEJORP-----E-----
-----R-MN-----V-----
-----lowercase-E-----B-----
-----CECAFRETINIMONITOR-IR-----A-----
-----O-AD-----S-----
-----ELECTRICITY-----CK-I-----
-----S-E-----SSC-----
-----R-T-TE-LANGUAGE-----PD-----
-----N-E-----T-----
-----I-L-----DICTIONARY-----
-----B-R-E-----R-----
-----L-P-W-----
-----Y-----H-----E-----
-----RETUPMOC-----O-P-----
-----NY-----
-----TE-FORTRAN-----
-----N-----
-----E-REPAP-----
-----M-----
-----E-----
-----T-----
-----S-----

```

```

CTEZADYVOKEDXCLICNEPC
WGQLZLFSH2OZYLSYDPVUDJTORKEVC
FQNJTCAAANLERVEBYCFIOGQJLAERUTQTXHH
XAADSZWCICQTDGZRUHETTLAJYONKDDGLEHC
WYKXIMEGLRRJPNMIKXHYGLOKUCURNSFEEDG
HRTQIUDUWRKODEFNEETZQKPMGNOBPNGSBN
YCFEFTPEBG FHRDYN ANPCOLEBHJRLX
DBLOSPEF SOCGPNCECAATTNNJWHEFCWJ
YRU OBTDRGWYPOTHIGQIBMVXSSQGPY
MEZPCDAMAFNBVPMNTEZLKZSPKCDMTD
JFFBQGPFAIDJTCROAUTGJXFTTUEWIDFF
QDUEZPERHVFJOGNFQCMXDDYAMNTNBDVTQ
TIEQWEMNIYRADIOHACKTGRMMXLRQKDCDTHKK
MNJKEATACUXDNTENIHACAMFWRETOUVXNWUZTCDHQS
RYXZJQYSBOS JOURNALAUOMATUCHXACUBH QHDF
TCEJORPFGSNWQETAYMHDSFLDNWZIDEEZZ QHER
V MCURURIAKYVCTFOVMLKNOHPLITINJRVJ FQIO
YX CFGECFZKMQUMZMKORlowercaseTEPHUIRI DGBJ
KN NCYCECAFRETINIMONITORNSWICFEGQBRDXULR BDAMN
QYHJINOWZJURZBNYPYSTGYAGXBCUAMYFGPNXADYTGNSF
VSNMGRACQVLETRICITYWVZSKBSKRCATSPMEKCCIDHG
AYRNLDCOMILOVVRGFXSNCLQWKBUIRNLAEFLUGSSCDW Z
NSBLZEARJGSEIGTEHPLAVRNCOBOLTJBRUREKQOARIZU US
EPSRCJRHAYZLETBQZDTNPLANGUAGELNEZPTAZGXPDPJHC
LMEHAKTCRUYKBHNTINEXPIZVPEDMNPTJZOPMNAZ QHPCQKUH
YMHQGPFIJUGMZTHIELVJPEFIPOIUTCKJIBOEDITIONARYGN
TFBNSVADLIEVMPHRYETLHXGUARWHJNZUACYPUMIJDZML
ILLJNOBJCGNZLIEYFPIBESKNWRBXX NTHYEBJ
XXYVJPTKPSJVKKNHRRHFIEQTYMDEC
SAMQOGKRETPMOCBPBTOUKPMXRTKZDZGNYKMOVPTDPOVOWGLXSO
QTMGOGRKBELZHVFTNYOYPPZEZCKLJELJOVQJXJNAGWUDUCX
BACJXTMRQOKPYETLFBORTFRANTCUXHDXDX
QJYAZDNZOHYXOYBSGTXYVZWOOCXMKFDY
DLERIMREPAPTYFFH
PAEMBNYXZMEGRJZIJ
BMQOCPHABRQXK
VBOORTBYLQKTYHU
IDOBRTNNAZIGMXZBYJELC
VNJNGQFGEFTLVXIXVADGBJQQ
OZALKIPUDXYOSWFEOJQVIXULQZ

```

THE FOLLOWING	WORDS ARE HIDDEN --	COMPUTER	BASIC	FORTRAN
RADIOHACK	BOUS JOURNAL	TELEPHONE	PENCIL	LANGUAGE
COBOL	PASCAL	COMMUNICATIONS	ASSEMBLY	DISK DRIVE
TYPEWRITER	INTERCONTINENTAL	PRINTER	MONITOR	PROJECT
PROGRAMMER	INTERFACE	GRAPHICS	RECORDER	THE END
MACHINE	lowercase	MACHINE	ELECTRICITY	
PAPER	DICTIONARY	FLUORESCENT		

DATA statements to mark the end of each line. These are optional, but they make it easier to find locations. As each value is read, H alternates between 1 and 0. When it is 0, spaces are printed, otherwise dashes are printed. V is the line length. When V gets to 61, it is reset to 1 and a new line is started. J is the line counter. You now have the matrix filled with spaces or dashes. Words and random letters will replace the dashes as described above.

To get to the second cartoon, the first set of data is read and discarded until a 70 is reached. This doesn't seem very elegant, but it is quick and easy. You are now ready

to create the second cartoon as described above. Only 2 are shown in this program, but there is no reason you can't add more of your own.

Creating a Cartoon

The easiest way is to first run this program and get a 60 by 40 block puzzle printed. Now, draw your picture directly on this puzzle, observing the discrete letter positions. The rest is easy, but tedious. I suggest using a 10-character-per-inch printer and a ruler marked in tenths of an inch. Remember that the far left column must be a space. Write your DATA statements with the

```

-----MINIFLOPPY-----
-----ET-----
-----CE-----
-----B-SR-----
-----O-T-EE-----
-----U-H-RA-----YTICIRTCLE-----
-----S-EP-OC-----
-----R-UE-----S-B-----
-----J-EI-L-----C-A-----SNOITACINUMMOC-----
-----O-NH-P-----I-S-----ESCTEWOI-----
-----UPDT-----H-----I-YLBESSA-----
-----RR-E-----P-----T-----C-----
-----O-N-R-----A-----E-----Y-----
-----P-L-G-A-R-R-----L-----RETIRWEPYT-----
-----RI-R-----L-----E-----I-A-----
-----COA-----T-----P-RECORDER-----A-----
-----N-MJ-----U-----H-----O-----L-----
-----E-M-E-----P-----O-----
-----P-E-----PM-----N-----
-----R-TC-----A-----E-----C-N-----
-----N-----C-----O-----I-G-----
-----T-----A-----B-----M-----D-----U-----
-----D-I-----L-----O-----A-----
-----I-N-----C-----N-----E-----
-----S-E-----I-----E-----
-----N-K-N-----T-----
-----A-D-T-----O-----
-----R-R-A-----R-----
-----T-I-L-----ENTHACAM-----RADIOHACK-----
-----R-V-----
-----OE-----
-----F-----
STATEMENT

```

```

NDYOELDBKGX QDLIDQZKWB
GUBFLOTIDKTOH HOEAQVDLPEAVWCVAY
JFETLJCNWJOPCUENU XHQQAWZIMINIFLOPPYFO
RTIJRHATJETFOLXJUSVM NEAHJJSOPZKOSUUTTMAYD
HKDNOCTIGYDPCXJXJYVCSI AZJNWJZKHDSJREZTIWRHC
NQLKHZOBUEWHKSRORPDWDFZ TBJJPIISJJPFGJKBYYBBHY
HYTWVTZHOUTCJCCOEFQSSXNUK FSKSEXRBQJQWPMOJITEPR
LWCVXVOWKHQAPRAVHUVIT ITIDJEBVYITICRTCELEGYZ
NBCNZGPIFJEPKWOCDTAV ISFMSKHLKABKOENSUVPKD
CHHKLUHSU H RYVUEZV MURCCSLBFQ BZWSLLDLURSBOPBJAY
DIWDNACRYEQJOEIMVDLU MUOCGOKA SNOITACINUMMOCZNPIC
MHMEDWJZSTVOVNWEXFVKUWIBIVVYKVCesacrefwoIDENNAECNPK
RPFYOSFPUQPTYVYOKVZBIFLVEYXINEYLBESSAQZWNMCO
BUEHIRRDPEAYLJOKTPRHIFTTZEYCTRTPSPJXENDJ
FKTXOYXNBVRNHIMKARXSXSHIECNBZGSGNSFPFSSOXCO
LTPUALGGUWPLAMSCRBSRKLJYTOZLQSTRETIRWEPYTIYHEFYQJ
WOERIARLSIARLOLXEGRHZYFUOK EAVPWJZCYWCNEXCEBERNF
STRACADYGBHSGDCQCTXTHTZIDMPQZRECORDERISBZDNACTNIO
HXJZJGMEJRLYLHAQ UAMBNVRHEHWUK WKQRLSYNBVLWUG
PVQMETMOIELPYNUX PLYBHWAOYPT DZBRSOILIDZYXLN
UWCPQETUAHCDUOAD PMGFITANFEX WOWNIEAENSTPMIGK
YJENRSWZFBMTCTHQ ATOMTWEIZB GPTWUBFKHBLDOU
RQXCKRKYLSZPCPOOD DSLEQJLKEWA DAZCNUUQGOZJCXMT
JYZRWGZLNHSHKBCVJYJGSCWHDNQJGRUTXDDMBOKIEGGLCHIQHGDGP
GBSJSJNSOLVKNNTFIUJGHQXREAJEBNOSYQMXWYATQDSUQFAFEKACOWPLT
CWBNDUMXBTDFJGNZEPVDLQBOXQFNIRTSOLTCBGALQVHLMBNICYD
PHXUCQNOVIMNZNCRLRAJEPQCHXPTLVNSXGTZGZJJRBLGLAZXOECHS
OXNSHTVPSJEDTLUODNAHKLQLOPXWVHLEPEZAZVTHAFAPTRP
JONIMDYKBN VJNORHYVLGLBZOEHTICANLAX JLYBUNGZBJR
ZBAHROEDKT FPDAKTSGEHCMBMOOGIPIVH EAMKTVZJKK
SWLRPDERUAZ LMFVTWSAHOHOFXRTURU GMZSKHCFH
NONTJAINLB WENIHACAMLOJTUV RADIOHACK
XPTREFVDHIE SRNWA YUWRHRCV
ZABOJEXEGJ IBZABPTGADC
HKIFLOLJWOYR AXDZCGGWTYAS
QUATERWYHNTNDRO STATEMENTJGGBALP
JKUJCTGAROTZIBSNKHQZUDQVJNHFHRJZ
WUTSZOGAJZQJNRYMPCPNINAEAFCW
NTJLFTLOLRYNRDRZARMC
BDICITYWFLDIW

```

THE FOLLOWING	WORDS ARE HIDDEN --	BOUS JOURNAL	BASIC	COBOL
RADIOHACK	COMPUTER	TELEPHONE	LAUNGE	COMMUNICATIONS
FORTRAN	PASCAL	ASSEMBLY	STATEMENT	CONTINENTAL
PENCIL	TYPEWRITER	PRINTER	lowercase	GRAPHICS
PROGRAMMER	INTERFACE	MACHINE	RECORDER	PROJECT
MONITOR	DISK DRIVE	FLUORESCENT	MINIFLOPPY	THE END
DICTIONARY	ELECTRICITY			

Word find

number of spaces and dashes like I did and change lines 180 and 270 to allow the new cartoon. The DATA statements take so little room that you could easily offer a choice of 10 or more outlines.

Hints and Options

The size of this puzzle makes it quite difficult to solve. There are several ways to make the words easier to find. One way is to enter a letter or the whole word in lower-case. Just hold the shift key down. Another way is to add a space or punctuation after the word. I had planned to offer a 30 by 40 format with a space after each letter, but the cartoons looked terrible. Give this program a little thought and you can think up several ways to customize it for your own needs.

Color Computer Conversions

Divide all PRINT@ values by 2, change all LPRINT commands to PRINT#-2, and delete in line 130: DEFINT A-Z. Leave the rest of line 130 as is.

Program Listing for Word Find

```
100 ' WORDFIND/BAS — 06/10/82
110 CLS:PRINT@88,"W O R D F I N D":PRINT
:PRINT"THIS PROGRAM WILL CREATE A WORD S
EARCH PUZZLE"
120 PRINT"IN A 60 BY 40 MATRIX. A MAXIM
UM OF 75 WORDS MAY BE HIDDEN.
130 CLEAR5500:DIM A$(61,40),B$(60,40),W$
(75):DEFINT A-Z
140 PRINT:INPUT"HOW MANY WORDS (75 MAX)
";N
150 IF N>75 OR N<3 THEN 140
160 FOR I=1 TO N
170 PRINT "WORD # ";I;" IS ";:INPUT
W$(I):NEXT
180 PRINT"PUZZLE TO BE: (1) MICKEY MO
USE":PRINT TAB(17)"(2) DONALD DUCK":PRIN
T TAB(17)"(3) BLOCK ";:INPUT"CH
OICE ";V
190 IF V<1 OR V>3 THEN 180
200 IF N<40 THEN 260
210 CLS:PRINT:PRINT "SORTING NOW, SORT
# - ";
220 FOR J=1 TO N-2:FOR I=1 TO N-1
230 IF LEN(W$(I)) >=LEN(W$(I+1)) THEN 25
0
240 W$(0)=W$(I):W$(I)=W$(I+1):W$(I+1)=W$
(0)
250 NEXTI:PRINTJ;:NEXTJ
260 PRINT:PRINT"CREATING MATRIX NOW, RO
W -- ";
270 ON V GOTO 310,300,280
280 FOR J=1 TO 40: FOR I=1 TO 60
290 A$(I,J)="-":NEXTI:PRINT J;:NEXTJ:GOT
O 370
300 READ U:IF U<70 THEN 300
310 FOR J=1 TO 40
320 H=0:V=1
```

```
330 READ U: IF H=1 THEN 350
340 FOR I=V TO V+U:A$(I,J)="-":NEXTI:H=1
:V=V+U:GOTO 360
350 FOR I=V TO V+U:A$(I,J)="-":NEXTI:H=0
:V=V+U
360 IF V<61 THEN 330 ELSE PRINT J;:NEXT
J
370 CLS:I=0
380 I=I+1: IF I=N+1 THEN 920
390 Z=LEN(W$(I)):C=0
400 PRINT@40,"PLACING ";W$(I);" ":PR
INT@40,"TRIAL ";
410 C=C+1:PRINT@47,C;:IF C>99 THEN PRIN
T:PRINT@130,"CAN'T PLACE ";W$(I):GOTO3
80
420 A=RND(60):B=RND(40):D=RND(8)
430 ON D GOTO 440,500,560,620,680,740,80
0,860
440 IF A+Z>59 THEN 410
450 FOR J=0 TO Z-1
460 IF A$(A+J,B)<>"-"THEN 410
470 NEXT:FOR J=0 TO Z-1
480 A$(A+J,B)=MID$(W$(I),J+1,1)
490 NEXTJ:GOTO380
500 IF A+Z>59 ORB+Z>39THEN410
510 FOR J=0 TO Z-1
520 IF A$(A+J,B+J)<>"-"THEN410
530 NEXT:FOR J=0 TO Z-1
540 A$(A+J,B+J)=MID$(W$(I),J+1,1)
550 NEXTJ:GOTO380
560 IF B+Z>39 THEN410
570 FOR J=0 TO Z-1
580 IF A$(A,B+J)<>"-"THEN410
590 NEXT:FOR J=0 TO Z-1
600 A$(A,B+J)=MID$(W$(I),J+1,1)
610 NEXTJ:GOTO380
620 IF A-Z<1 OR B+Z>39 THEN410
630 FOR J=0 TO Z-1
640 IF A$(A-J,B+J)<>"-"THEN410
650 NEXT:FOR J=0 TO Z-1
660 A$(A-J,B+J)=MID$(W$(I),J+1,1)
670 NEXTJ:GOTO380
680 IF A-Z<1 THEN410
690 FOR J=0 TO Z-1
700 IF A$(A-J,B)<>"-"THEN410
710 NEXT:FOR J=0 TO Z-1
720 A$(A-J,B)=MID$(W$(I),J+1,1)
730 NEXTJ:GOTO380
740 IF A-Z<1 OR B-Z<1 THEN410
750 FOR J=0 TO Z-1
760 IF A$(A-J,B-J)<>"-"THEN410
770 NEXT:FOR J=0 TO Z-1
780 A$(A-J,B-J)=MID$(W$(I),J+1,1)
790 NEXTJ:GOTO380
800 IF B-Z>1 THEN410
810 FOR J=0 TO Z-1
820 IF A$(A,B-J)<>"-"THEN410
```

```

830 NEXT:FOR J=0 TO Z-1
840 A$(A,B-J)=MID$(W$(I),J+1,1)
850 NEXTJ:GOTO380
860 IF A+Z>60 OR B-Z<1 THEN410
870 FOR J=0 TO Z-1
880 IF A$(A+J,B-J)<>"-"THEN410
890 NEXT:FOR J=0 TO Z-1
900 A$(A+J,B-J)=MID$(W$(I),J+1,1)
910 NEXTJ:GOTO380
920 PRINT@0,"FILLING IN MATRIX WITH RAND
OM LETTERS, ROW -- ";:FOR J=1TO40:FOR I=
1TO60
930 IFA$(I,J)="-"THENB$(I,J)=CHR$(64+RND
(26))ELSE B$(I,J)=A$(I,J)
940 NEXTI:PRINTJ;:NEXTJ
950 PRINT:INPUT"PRESS <ENTER> WHEN PRINT
ER IS READY";Q$
960 FORJ=1TO40:FORI=1TO59:LPRINT B$(I,J)
;:NEXTI:LPRINT B$(60,J):NEXTJ
970 LPRINT:LPRINT"THE FOLLOWING WORDS AR
E HIDDEN --"
980 FOR I=1TO N STEP5:LPRINT W$(I),W$(I+
1),W$(I+2),W$(I+3),W$(I+4):NEXT
990 INPUT"DO YOU WANT THE ANSWER (Y OR N
)";Q$:IF Q$<>"Y"THEN END
1000 FORJ=1 TO40:FORI=1TO59:LPRINTA$(I,J)
);:NEXTI:LPRINTA$(60,J):NEXTJ

```

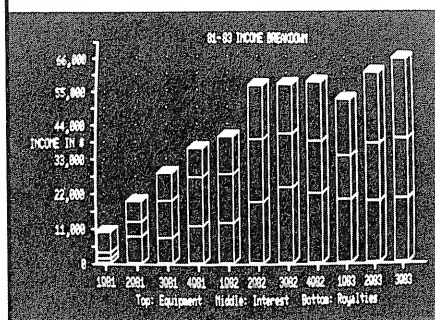
```

1010 DATA 8,11,25,11,5, 5,17,18,17,3, 4,
20,14,20,2, 3,21,13,22,1, 2,23,12,22,1
1020 DATA 1,25,11,23, 1,25,11,23, 1,24,1
3,22, 1,23,14,22, 2,21,3,10,3,21, 2,20,5
,8,5,19,1, 3,55,2, 6,49,5
1030 DATA 9,42,9, 10,42,8, 6,49,5, 6,50,
4, 5,52,3, 4,16,5,13,5,15,2, 3,16,7,11,7
,15,1, 3,16,7,11,7,16, 3,16,7,11,7,16
1040 DATA 2,18,5,13,5,17, 2,58, 2,58, 3,
57, 4,56, 4,55,1, 5,11,3,25,3,11,2, 5,11
,3,25,3,11,2, 6,11,5,20,5,10,3
1050 DATA 7,10,7,15,7,10,4, 7,12,10,5,10
,11,5, 8,13,21,12,6, 10,13,17,13,7, 12,1
6,7,17,8, 14,36,10, 16,31,13, 20,23,17,
24,14,22
1060 DATA 70,18,20,22, 13,30,17, 12,36,1
2, 9,40,11, 6,42,12, 4,39,17, 2,9,7,20,2
2, 3,7,7,23,20, 5,3,7,27,18
1070 DATA 12,32,16, 10,35,15, 8,38,14, 6
,40,14, 5,42,13, 5,36,2,5,12, 4,36,4,4,1
2, 1,1,2,35,6,4,11, 1,2,1,35,6,4,11
1080 DATA 1,2,1,36,4,5,11, 1,47,12, 1,47
,12, 1,46,12,1, 1,45,12,2, 1,44,10,5, 2,
43,5,10, 4,53,3, 4,49,7, 5,31,4,7,13
1090 DATA 6,32,22, 8,52, 10,50, 12,37,11
, 13,32,15, 18,17,25, 18,17,25, 19,15,26
, 18,17,25, 16,21,23, 15,24,21, 14,27,19

```

BizgraphTM

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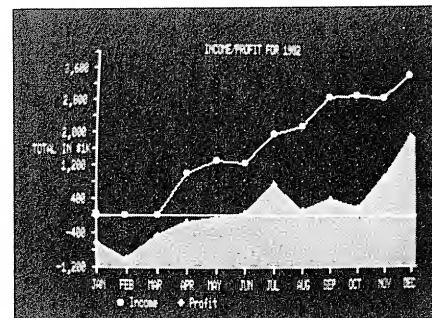
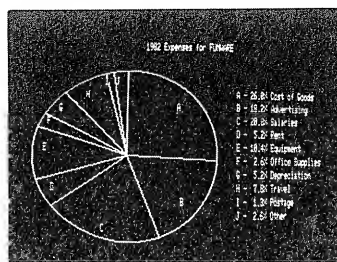


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The Grafyx Solution package is shipped from stock and includes the board, 44 programs, and a 54 page manual all for \$299.95. The BIZGRAPH program, sample graphs, and manual is \$98. Shipping is free on pre-paid or COD orders. (Tx. res. add 5% sales tax.)

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Exploring VisiCalc

Answering readers' questions

Models I/II/III

Timothy K. Bowman, Contributing editor

Before I answer several questions that have been sent in, I would like to take this opportunity to thank you for your overwhelming response to this column. So far, two columns have generated most of my mail: the stock program column and the command files column. Look for future columns on DIF, VisiCalc information sources, graphics, and much more. Send in your questions or suggestions for future columns to me in care of *Basic Computing*. Please enclosed a stamped, self-addressed envelope if you desire a personal response. We all have a lot of VisiCalc exploring to do.

How can I print my reports with double spacing?

There are two ways that this can be accomplished. The first way is by invoking the print command (/PP). The prompt line then shows "Lower right, "Setup, -, or &." By pressing the shifted 6 key (&) all output is printed in double spacing. The second way is to simply insert a blank line between each line used in your VisiCalc file by using the /IR (insert row) command. If you wanted to insert a number of lines, a series of /IR command routines

could be built into a command file. Do you see how to print only a portion of a report printed in single-spacing and a separate portion printed in double-spacing?

My VisiCalc clobbers a serial printer driver that is loaded in high memory. How can I preserve it?

In order to preserve a serial printer driver, set the memory size, load the driver, and be sure to change the device control block found at 4025H to point the DCB to the high memory driver program and the VisiCalc program will honor the driver program. This method is actively used by at least one reader who uses VisiCalc on a Model I with a serial printer. If you are unsure about DCB's, look back at the December, 1982 issue of *80-U.S. Journal* for a discussion on Device Control Blocks (Driver Education on page 50). If you find the above instructions are too vague, contact me in care of *Basic Computing*, and I will give more specific guidance.

When I load certain files, some of the cell positions show "error." Is there a way to eliminate the error message?

The reason that error shows up in a certain cell position is that those cell positions depend upon other cell positions which have not yet had correct values calculated before the value was needed for another calculation. There are several solutions to the problem. First, you can force the sheet to recalculate all values by pressing the shifted one key (! key). This should remove all error messages. A second method is to change the order of recalculation by typing /GOR if the recalculation order is currently by columns or /GOC if the recalculation order is currently by rows. Third, it is important that formulas which depend upon previous cell position calculations be positioned to the right and below that previous cell position.

I load my Model III VisiCalc program and it shows I only have 18K of memory available. Is there any way to gain more memory?

In short, no. While there are only 18,000 bytes of memory, a key solution is to use memory conservation techniques. For examples of those techniques, see back columns of *Exploring VisiCalc*

and especially the October, 1982 issue. I will also be sharing other memory conservation tips in future columns. Watch for them. To tantalize you a bit, I understand that my Model IV version of the electronic spreadsheet will be able to use the full 128K capacity of that machine. Watch this column for further news!

Your column on command files provided me the key to clearing big portions of my spreadsheet, but it seems to take too long. Is there a quicker method? Yes, a quicker way is to create a DIF file which is the size of the area that you wish to clear and contains nothing but blank cell positions. Then, position the cursor in the upper left corner of the area to be cleared and load the blank DIF file. Quick and painless!

I find it difficult and frustrating to remember what filename I last saved my spreadsheet under. Is there an easier method to remember the filename short of taking a memory enrichment course?

An easy method of remembering the filename under which a spreadsheet is saved is to write the name of the file in the upper left corner of the sheet (cell position A1) and not make any other entries on that line. Then, when you go to save the file to disk, simply match the filename on the command line with that found in position A1. Be sure to keep in mind when printing your sheet that your printing should start in cell position A2 unless you want the filename to be printed. This should be especially helpful to you Model I VisiCalc users who don't have the feature that helps prevent the overwriting of existing files.

Finally, I would like to make a plug for a significant banking industry microcomputing conference. If you want to see all that is available in microcomputers and banking (including VisiCalc), plan to attend Bank Administration Institute's MICROScape '83 at the Hyatt Regency, Chicago, August 28-31, 1983. I'll be speaking there and would enjoy meeting any of you who would be able to make the conference.

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Commbat is a two player tank strategy game that can be played over a modem. In this game, the playing field is divided into a two by four matrix of sectors that are further divided into a 32 by 16 matrix. The player is given eight tanks, a base, three decoy bases, and various weapons including rockets, lasers, shells, mines and one ICBM. Your mission is to locate the enemy's base and destroy it with your ICBM, before he can discover the location of your base. Commbat comes complete with a TRS-80, Apple, and Atari disk for one low price.

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Universal printer driver

Exploit your printer's capabilities with simple commands

Model III, Scretsit 3.2

Gary A. Shade, Arlington Hts., IL

There have been numerous articles detailing patches to Scretsit, for use with various printers. None of the patches that I have seen modifies Scretsit 3.2, a version for the Model III. While the Model I Scretsit can be used on the Model III, I would prefer to use the latest revision for my machine. All of the patches have one common goal and that is to give the user the ability to exploit the capabilities of the many printers on the market.

This article details a patch to the Model III Scretsit 3.2 that will allow you to embed printer commands in the body of a document. You will be able to switch between normal print width or double-size characters, change pitch, sound bells, or other printer-specific functions. All of this can be accomplished on the same line. By the end of this article, you should have enough knowledge of the routine and driver to enable you to create your own command tables for your printer (or typesetter).

The Program

The program expects a command character to be immediately after the pound sign (#). A table is searched for a match to the command character. If one is found, special printer codes are sent to the printer instead of the character that was in text. If the driver does not find a match, the pound sign and the character are sent to the printer.

The “#” sign was chosen because Scretsit uses the greater-than symbol for its own formatting functions. I chose the pound sign to

avoid ambiguity. The original character that was in register A, on entry to the driver, must be in register A on exit from the routine.

Lines 210 to 300 of the program labeled PARLEL, load Scretsit into memory and change the parts of Scretsit that call the printer driver in the Model III ROM. No permanent changes are made to your copy of Scretsit, as the changes to it are made in memory and not on the disk. By loading the address of PARLEL-1 into memory location 5321H, we fool Scretsit into thinking that this is the end of memory. This protects the driver program from being clobbered. It is similar to answering the memory size question in BASIC. It

protects a machine language program that you have loaded into high memory.

If this part of the code looks familiar to some of you, it is because the code can be found in the back of your Scretsit manual. The only problem is that the suggested patch is for the Model I version of Scretsit, not the Model III version.

Table 1 contains all the command letters used by the program. You can assign any keyboard character as a command character. It's up to you. Be sure to terminate the entries in the table with 0FF (hex). Table 2 is the table that actually contains the printer control codes. There are three bytes per entry. If only one

Figure 1 — Text as printed by Scretsit with the driver.

```
the printer this is created on is the Line Printer IV.
The characters that the printer can print, but are not
available on the keyboard are;
' [ ] \ _ ' < > | ^ ^.

The pitch can be changed on a new line.
You can print equations with some fancy codeing as well.


$$Y=2x^3-r_1^5$$


A slash zero is a combination of zero, backspace and slash.
#. A spanish ñ or Ñ can also be created.

END OF DEMO.
```

control character is required to initiate a printer function, the remaining two bytes of the entry must be set to OFF (hex). The maximum number of characters that must be sent to the Line Printer IV to initiate a function is two. Therefore, I made the table entries a mandatory three bytes. The final byte is always OFF (hex).

The module called DRIVER is the driver that Scripsit now uses to send characters to the printer. It is short and sweet with no frills or flashing lights. However, it does convert embedded commands to usable printer codes. If you've thought about buying a commercial patch such as Scriplus or Scriptr, you may find that this will suit your needs. It is certainly much less sophisticated than the commercial versions, but if all you're trying to do is send controls to the printer, you will not beat this driver's price. See the print samples in Figures 1 and 2 that demonstrate the Centronics 739's (Line Printer IV) capabilities. This patch is on the house.

Setting Up Your Own Tables

Table 1 and Table 2 are the tables you will alter by creating similar command tables with the codes required by your printer. Table 1 is the table that contains the character you designate as the command character that would follow the # sign. These symbols would be embedded in your document. Table 2 is the table containing the actual control codes your printer requires to enable or execute a function. Consult your printer manual to determine what the actual codes are for your printer.

Your printer may require more than three codes for a given function. Just remember that all entries in the table must be the same number of bytes, and the entry must terminate in OFF (hex). The other thing to remember is that for every byte in an entry, there must be a corresponding (INC DE) instruction inserted in the driver at the label NOTYET. See the listing. It is commented.

Also remember that the first entry in the command table (Table 1) corresponds to the first entry in the function table (Table 2). The second corresponds to the second, etc.

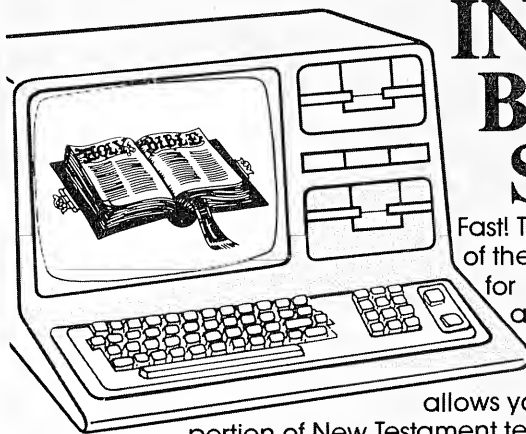
Figure 2 — Actual text as it appears on the screen. When printed under control of the driver in this article, and with a Line Printer IV (Centronics 739), the output of Figure 1 is obtained.

```
the printer this is created on is the #ULine Printer IV.#S
The characters that the printer can print, but are not
available on the keyboard are;
#J #1 #Q #2 #M #I #F #E #G #V #0.
#E#F The #Dpitch#N can be changed on a new line.
You can print equations with some fancy coding as well.
Y=2x#A3#H-r#H1#A#A5#H
A slash zero is a combination of zero, backspace and slash.
0#C/. A spanish n#C#A#V#H or N#A#C#V#H can also be created.
#DEND of DEMO.
```

Figure 3 — Summary of Line Printer IV control codes.

CODE	PRINTER FUNCTION	DECIMAL FORMAT	USE
CR	Print Command, Carriage ret.	13	#K
LF	Full line feed forward	138	#L
SI	Start Underline	15	#U
SO	Stop Underline	14	#S
ESC,LF	Full L.F. reverse	27,138	#R
ESC,SO	Start double width characters	27,14	#D
ESC,SI	Stop " "	27,15	#N
ESC,DC1	Select proportional characters	27,17	#P
ESC,DC3	Select 10 CPI Monospaced Chars.	27,19	#T
ESC,DC4	Sel. 16.7 CPI Monospaced Chars.	27,20	#E

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Driver

To get more elaborate, you could decrement the printer's character/line counter (memory location 402A hex), when you command the printer to backspace. Or, increment the counter twice when printing in double-width mode and once when printing any character that would not be generated from the keyboard. This would prevent the words from wrapping around at the end of a printed line.

I hope you enjoy experimenting with this driver and expanding upon it.

ESC,FS	Half line feed forward	27,28	#H
ESC,RS	Half line feed reverse	27,30	#A
ES,N-1	Back Space one character	8,(n-1)	#C
		n=10 for 10 cpi	
		n=9 for 16.7cpi	
PRINTABLE	HEX	DECIMAL	USE THIS
CHARACTER	CODE	CODE	SEQUENCE
ACUTE	27	39	#J
LEFT BRACKET	5B	91	#I
RIGHT BRACKET	5D	93	#Q
CARROT	5E	94	#2
UNDERLINE	5F	95	#M
GRAVE	60	96	#I
LEFT CURLY BRK	7B	123	#F
RIGHT CURLY BRK	7D	125	#E
RULE	7C	124	#G
SINE	7E	126	#V

```

00100 ;***** MODEL III; TRSDOS 1.3, SCRIPSIT 3.2 *****
00110 ;***** PRINTER PATCH BY GARY A. SHADE *****
00120 ;THIS ROUTINE LOADS AND MODIFIES SCRIPSIT TO PERMIT
00130 ;USE OF YOUR OWN PARALLEL DRIVER
00140 ;
00150 ;IT SHOULD BE LOCATED IN HIGH RAM. THIS EXAMPLE
00160 ;IS LOCATED AT FC00 FOR A 48K MACHINE.
00170 ;REQUIRES MODULES-SCRIPDRV/ASM AND TABLEPI/ASM
00180 ;PUT NAMES IN DOWN BELOW
FC00 00190 ORG 0FC00H
FC00 00200 PARLEL EQU $ ;ENTRY ADDRESS
FC00 CDC901 00210 CALL 01C9H ;CLEAR SCREEN
FC03 11FFFC 00220 LD DE,DCBADR ;DE=> FILE SPEC
FC06 CD3044 00230 CALL LOAD ;OPEN AND LOAD SCRIPSIT
FC09 CD2844 00240 CALL CLOSE ;CLOSE COMMAND FILE
FC0C 21FFFFB 00250 LD HL,PARLEL-1
FC0F 222153 00260 LD (5321H),HL
FC12 211EFC 00270 LD HL,DRIVER ;ADDR. OF YOUR DRIVER
FC15 227460 00280 LD (6074H),HL ;ROUTINE
FC18 226C60 00290 LD (606CH),HL
FC1B C30052 00300 JP 5200H ;ENTER SCRIPSIT
00310 ;***** DRIVER/CONVERSION ROUTINE *****
00320 ;** THIS ROUTINE WILL CONVERT EMBEDDED COMMANDS **
00330 ;** TO CONTROL CODES FOR LP IV. USE WITH SCRIPSIT **
00340 ;*****
00350 ;
003B 00360 PRCHAR EQU 003BH
FC1E 00370 DRIVER EQU $
FC1E E5 00380 BEGIN PUSH HL ;SAVE HL AND DE AND A
FC1F D5 00390 PUSH DE
FC20 F5 00400 PUSH AF ;SAVE CHARACTER IN A
FC21 3AE837 00410 TEST LD A,(37E8H) ;TEST PRINTER STAT
FC24 CB7F 00420 BIT 7,A ;LOOP TILL RDY
FC26 20F9 00430 JR NZ,TEST
FC28 3A0CFD 00440 LD A,(FLAG1)
FC2B FE00 00450 CP 0
FC2D C244FC 00460 JP NZ,CONTRL ;NON-ZERO=CONTROL CODE
FC30 F1 00470 POP AF ;RETRIEVE ACC A
FC31 FE23 00480 CP '#' ;FIRST PART OF CONTROL CHR
FC33 C259FC 00490 JP NZ,PRINTI ;IF# THEN PRINT
FC36 F5 00500 PUSH AF ;SAVE IT AGAIN
FC37 3EFF 00510 LD A,0FFH ;IF IT IS '#' SET THE

```

FC39	320CFD	00520	LD	(FLAG1),A	;FLAG FOR FOUND '#'
FC3C	AF	00530	XOR	A	
FC3D	320DFD	00540	LD	(FLAG3),A	;CLEAR THE COMMAND FLAG
FC40	F1	00550	POP	AF	;RETRIEVE A
FC41	D1	00560	POP	DE	;RESTORE OTHER REGISTERS
FC42	E1	00570	POP	HL	
FC43	C9	00580	RET		
FC44	AF	00590	XOR	A	;CLR FORMAT EFFECTOR
FC45	320CFD	00600	LD	(FLAG1),A	;FLAG
FC48	F1	00610	POP	AF	;GET ACC A
FC49	CD5FFC	00620	CALL	SEARCH	;SEARCH THE TABLES
FC4C	F5	00630	PUSH	AF	;SAVE THE CHR IN REG. A
FC4D	3A0DFD	00640	LD	A,(FLAG3)	;IF FLAG = FF THEN DONE
FC50	3C	00650	INC	A	;INC PAST FF TST FOR ZERO
FC51	28E9	00660	JR	Z,HOMETT	;ZERO? THEN WE'RE DONE
FC53	3E23	00670	LD	A,'#'	;ELSE, SEND '#' TO PTR
FC55	CD3B00	00680	CALL	PRCHAR	;PRINTIT
FC58	F1	00690	POP	AF	;GET CHARACTER
FC59	CD3B00	00700	CALL	PRCHAR	;PRINT THE CHARACTER
FC5C	D1	00710	POP	DE	;RESTORE REGISTERS
FC5D	E1	00720	POP	HL	;& RETURN
FC5E	C9	00730	RET		
FC5F	219CFC	00740	LD	HL,TABLE1	;SETUP DUAL POINTERS
FC62	11B5FC	00750	LD	DE,TABLE2	;ONE FOR EACH TABLE
FC65	BE	00760	CP	(HL)	;FIND IT?
FC66	2023	00770	JR	NZ,NOTYET	;NO? THEN INC. POINTERS

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Driver

FC68 3EFF	00780	LD	A,0FFH	;IF YES SET THE FOUND FLAG
FC6A 320DFD	00790	LD	(FLAG3),A	;YES? THEN SET THE FOUND
	00800			;FLAG
FC6D 1A	00810	LD	A,(DE)	;GET THE CHAR TO SEND TO
FC6E D3F8	00820	OUT	(0F8H),A	;THE PRINTER
FC70 CD4004	00830	CALL	0440H	;WAIT ON PRINTER
FC73 13	00840	INC	DE	;GET THE NEXT CHR.
FC74 1A	00850	LD	A,(DE)	;
FC75 FEFF	00860	CP	0FFH	;END OF TRANSMISSION?
FC77 2821	00870	JR	Z,ENDIT	;YES? THEN END
FC79 D3F8	00880	OUT	(0F8H),A	;SEND TO THE PRINTER
FC7B CD4004	00890	CALL	0440H	;WAIT ON PRINTER
FC7E 13	00900	INC	DE	;GET THE NEXT CHAR
FC7F 1A	00910	LD	A,(DE)	
FC80 FEFF	00920	CP	0FFH	
FC82 2816	00930	JR	Z,ENDIT	
FC84 D3F8	00940	OUT	(0F8H),A	
FC86 CD4004	00950	CALL	0440H	
FC89 7E	00960	LD	A,(HL)	;RESTORE ORIGINAL COMMAND
	00970			;CHARACTER
FC8A C9	00980	RET		;DONE RETURN
FC8B 23	00990	INC	HL	;INC CMD CHAR. POINTER
FC8C F5	01000	PUSH	AF	;SAVE CHAR IN REG A
FC8D 7E	01010	LD	A,(HL)	;TEST FOR END OF CMD TBL
FC8E 3C	01020	INC	A	
FC8F 2807	01030	JR	Z,ENDTAB	

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```

FC91 F1      01040      POP      AF      ;RESTORE REGISTERS
FC92 13      01050      INC       DE      ;INC TO NXT 3 BYTE ENTRY
FC93 13      01060      INC       DE      ;OF PRINTER CODES
FC94 13      01070      INC       DE      ;**** NOTE ***
           01080 ;***** IF YOUR PRINTER/TYPESETTER REQUIRES A FOUR
           01090 ;BYTE CODE SEQUENCE TO EXECUTE A COMMAND INSERT ANOTHER
           01100 ;Z-80 (INC DE) INSTRUCTION HERE. THERE MUST BE ONE FOR
           01110 ;PER BYTE, FOR AN ENTRY IN TABLE 2 OF THIS DRIVER ****
           01120 ;
FC95 C365FC  01130      JP        NEXT      ;GO SEARCH THE NEXT ENTRY
FC98 F1      01140 ENDTAB POP      AF      ;CHAR NOT IN TABLE SO...
FC99 C9      01150      RET              ;RESTORE IT AND RETURN
FC9A 7E      01160 ENDIT LD        A,(HL)   ;GET ORIGINAL CHAR. AND
FC9B C9      01170      RET              ;RETURN TO SCRIPSIT
           01180 ;***** TABLE 1 CONTROL CHARS. FOR LPV *****
FC9C 4B      01190 TABLE1 DEFM      'KLUSRDNPTBHACVEFGJIMOQ12'
           4C 55 53 52 44 4E 50 54
           42 48 41 43 56 45 46 47
           4A 49 4D 4F 51 31 32
FCB4 FF      01200      DEFB      0FFH      ;END OF TABLE1
FCB5 0D      01210 TABLE2 DEFB      0DH      ;CARR. RET, PRINT CMD
FCB6 FF      01220      DEFB      0FFH
FCB7 FF      01230      DEFB      0FFH
FCB8 8A      01240      DEFB      8AH      ;FULL LF FWD
FCB9 FF      01250      DEFB      0FFH
FCBA FF      01260      DEFB      0FFH

```

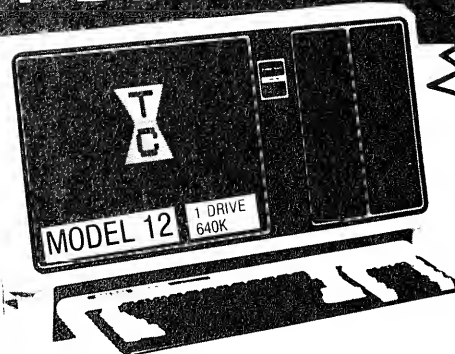
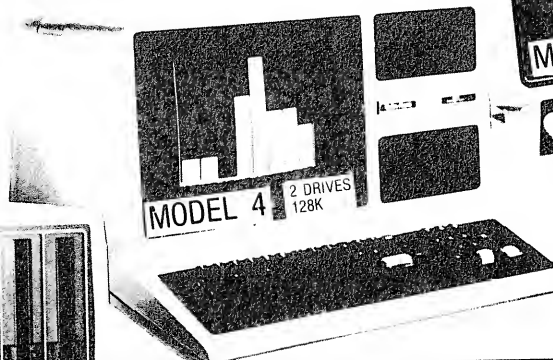
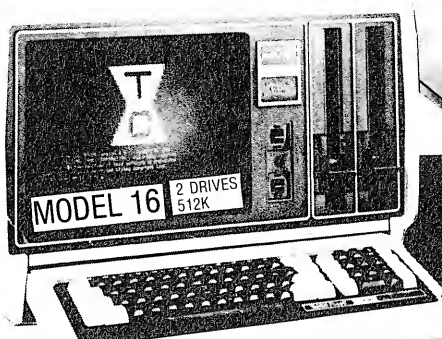
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FCBB 0F	01270	DEFB 0FH	;START UNDERLINE
FCBC FF	01280	DEFB 0FFH	
FCBD FF	01290	DEFB 0FFH	
FCBE 0E	01300	DEFB 0EH	;STOP UNDERLINE
FCBF FF	01310	DEFB 0FFH	
FCC0 FF	01320	DEFB 0FFH	
FCC1 1B	01330	DEFB 1BH	;FULL LF REVERSE
FCC2 8A	01340	DEFB 8AH	
FCC3 FF	01350	DEFB 0FFH	
FCC4 1B	01360	DEFB 1BH	;START DOUBLE WIDTH CHR
FCC5 0E	01370	DEFB 0EH	
FCC6 FF	01380	DEFB 0FFH	
FCC7 1B	01390	DEFB 1BH	;STOP "" "" "" ""
FCC8 0F	01400	DEFB 0FH	
FCC9 FF	01410	DEFB 0FFH	
FCCA 1B	01420	DEFB 1BH	;SELECT PROPORTIONAL CHR
FCCB 11	01430	DEFB 11H	
FCCC FF	01440	DEFB 0FFH	
FCCD 1B	01450	DEFB 1BH	;SELECT 10 CPI
FCCE 13	01460	DEFB 13H	
FCCF FF	01470	DEFB 0FFH	
FCD0 1B	01480	DEFB 1BH	;SELECT 16.7 CPI
FCD1 14	01490	DEFB 14H	
FCD2 FF	01500	DEFB 0FFH	
FCD3 1B	01510	DEFB 1BH	;HALF LF FWD
FCD4 1C	01520	DEFB 1CH	
FCD5 FF	01530	DEFB 0FFH	
FCD6 1B	01540	DEFB 1BH	;HALF LF REVERSE
FCD7 1E	01550	DEFB 1EH	
FCD8 FF	01560	DEFB 0FFH	
FCD9 08	01570	DEFB 08H	;BACKSPACE 1 CHR 16.7
FCDA 09	01580	DEFB 09H	
FCDB FF	01590	DEFB 0FFH	
FCDC 7E	01600	DEFB 7EH	;SINE
FCDD FF	01610	DEFB 0FFH	
FCDE FF	01620	DEFB 0FFH	
FCDF 7D	01630	DEFB 7DH	;RIGHT CURLY BRACKET
FCE0 FF	01640	DEFB 0FFH	
FCE1 FF	01650	DEFB 0FFH	
FCE2 7B	01660	DEFB 7BH	;LEFT CURLY BRACKET
FCE3 FF	01670	DEFB 0FFH	
FCE4 FF	01680	DEFB 0FFH	
FCE5 7C	01690	DEFB 7CH	;RULE
FCE6 FF	01700	DEFB 0FFH	
FCE7 FF	01710	DEFB 0FFH	
FCE8 27	01720	DEFB 27H	;ACUTE
FCE9 FF	01730	DEFB 0FFH	
FCEA FF	01740	DEFB 0FFH	
FCEB 60	01750	DEFB 60H	;GRAVE
FCEC FF	01760	DEFB 0FFH	
FCED FF	01770	DEFB 0FFH	
FCEE 5F	01780	DEFB 5FH	;UNDERLINE
FCEF FF	01790	DEFB 0FFH	
FCF0 FF	01800	DEFB 0FFH	
FCF1 5E	01810	DEFB 5EH	;CARROT
FCF2 FF	01820	DEFB 0FFH	
FCF3 FF	01830	DEFB 0FFH	

```

FCF4 5D      01840      DEFB      5DH      ; RIGHT BRACKET
FCF5 FF      01850      DEFB      0FFH
FCF6 FF      01860      DEFB      0FFH
FCF7 5B      01870      DEFB      5BH      ; LEFT BRACKET
FCF8 FF      01880      DEFB      0FFH
FCF9 FF      01890      DEFB      0FFH
FCFA 5C      01900      DEFB      5CH      ; SLASH
FCFB FF      01910      DEFB      0FFH
FCFC FF      01920      DEFB      0FFH
FCFD        01930 INIT   EQU      $
            01940 ;*****
            01950 ;           IF YOU HAVE A SPECIAL INITIALIZATION      *
            01960 ;           ROUTINE PUT IT HERE                        *
            01970 ;*****
            01980 ;
FCFD C9      01990      RET
FCFE 00      02000 SWITCH DEFB      0
FCFF 53      02010 DCBADR DEFM      'SCRIPSIT/CMD'
            43 52 49 50 53 49 54 2F
            43 4D 44
FD0B 03      02020      DEFB      3           ; MARK END OF FILESPEC
            02030 ;
4430        02040 LOAD   EQU      4430H      ; CALL TO DOS TO LOAD FILE
4428        02050 CLOSE EQU      4428H      ; CALL TO DOS TO CLOSE FILE
FD0C        02060 FLAG1  EQU      $
FD0D        02070 FLAG3  EQU      $+1        ; 1 BYTE FOR FLAG3
FC00        02080      END      PARLEL

```

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Thomas L. Quindry, Contributing editor

When I wrote last month's column, I didn't know that there would be an article on MID\$= in the May issue of *80-U.S. Journal* (page 38). Though it slightly upstaged my one tip concerning this function, there is still more to tell about MID\$=. I recommend that you read the May article as well as last month's column if you haven't already done so.

Vince Bly, who gave me the tip on redefining string locations in memory, suggested using this redefinition principle for screen dumps to a lineprinter. Based on our discussion, I have written the following two routines (Listings 1 and 2).

Listing 1 — Simple Screen Print Routine

```
20 'CONCEPT BY VINCE BLY
30 CLEAR128:V=0:SC$=""
40 V=VARPTR(SC$):POKEV,64:
LN%=15360
50 POKEV+1,PEEK(VARPTR(LN%)):POKEV+2,PEEK(VARPTR(LN%)+1)
60 FOR N=1 TO 15:I$=SC$:LP
RINTSC$
70 PRINT@960,I$;:NEXT
80 GOTO 80
```

Listing 2 — Enhanced Screen Print Routine

```
20 'CONCEPT BY VINCE BLY
30 VL%=0:VS=0:SC$=""
40 VS=VARPTR(SC$):POKEVS,64:LN%=0:LL=VARPTR(LN%)
50 FOR LN%=15360 TO 16320 STEP 64
60 POKEVS+1,PEEK(LL):POKEVS+2,PEEK(LL+1)
70 LPRINTTAB(8)SC$:NEXT
```

Using each of these routines with
50 Basic Computing

a Model I, I am told that if you have the Radio Shack lowercase conversion installed, you must make sure the upper/lowercase driver program is being used in order to get a proper screen dump. I suppose this applies to non-Radio Shack conversions also.

Each of these routines illustrates an important fact. The routine in Listing 1 sends to the line printer only the first 15 lines. It accomplishes its task by assigning the string variable to the screen width, 64, and the address of the first video line. After the contents of this video line are LPRINTed, the screen is scrolled by one line to replace the contents of the defined string with whatever characters were previously in the second line. This repeats until all 15 lines are LPRINTed. The screen display ends up exactly as it began and the routine ends.

Listing 2 is a little more sophisticated. The string location is continually repositioned to point to successive video addresses representing lines one through sixteen of the screen and each is LPRINTed.

These two routines show the full power of this little tip. If the string position remains static in memory as in Listing 1, whatever data is placed within the bounds of the defined string area becomes the value of the string. If the string position is dynamic in memory, as in Listing 2, data that is occupying the bounds of the newly-defined string becomes the value of the string.

The nice thing about redefining the string area is that you can do it anywhere in memory, including ROM (as we saw last month). This, coupled with the properties of the MID\$= function, becomes very

important, as we shall see. If a string was placed in reserved string space, or higher (protected memory), the MID\$= function would make a direct substitution of characters to that location. Listing 3 uses this principle.

Listing 3 — TRSDOS Diskette Renaming

```
10 'RENAME TRSDOS DISKETTE

20 POKE 16561,&HEE:POKE16562,&HBE:POKE16409,1:CLEAR50
30 FOR N=&HBEF0 TO &HBEFC:
READA:POKEN,A:NEXT
40 IF PEEK(293)<>73 THEN P
OKE &HBEFA,221:POKE &HBEF1,0
50 DEFUSR=&HBEF0
60 N1$="":N1=VARPTR(N1$):P
OKEN1,8:POKEN1+1,&HD0:POKE
N1+2,&HBF
70 DATA 17,1,17,1,0,0,33,0,191,205,117,70,201
80 CLS:PRINT"RENAME TRSDOS
DISKETTE
90 PRINT:PRINT"PLACE DISKE
TTE IN DRIVE:0 AND PRESS <
ENTER> OR 'Q' TO QUIT.":PR
INT
100 Y$=INKEY$:IFY$=""THEN
100 ELSE IF Y$="Q" THEN EN
D
110 X=USR(0):PRINT"CURRENT
NAME IS "N1$:PRINT
120 N3$=N1$:INPUT"ENTER NE
W NAME";N3$:N3$=N3$+"
":MID$(N1$,1,8)=MID$(N3$,1,8) REM EIGHT SPACES BE
TWEEN QUOTES
130 PRINT:PRINT"ENTERING "
N1$:FOR N=1 TO 500:NEXT
```

```

140 IF PEEK(293)<> 73 GOTO
160
150 POKE &HBEFA,0:X=USR(0)
:POKE &HBEFA,117:GOTO 80
160 POKE &HBEFA,239:X=USR(
0):POKE &HBEFA,221:GOTO 80

```

This BASIC program can only be run with TRSDOS 1.3 or 2.3. The program is set up for 32K, or greater, memory.

In this program, the first sector of the directory track of a Model I or Model III TRSDOS diskette is read and the information placed in a buffer which is located in protected memory. Line 20 protects the memory. In line 30, the DATA statement (line 70) is read and placed just below the buffer area. This code represents a small machine language subroutine to read the first sector of the directory track. Line 40 makes small changes to the subroutine just placed in memory if a Model I computer is being used. (This technique was explained in my June column.) Line 50 sets up the USR function address and line 60 creates a dummy string and then redefines it; giving it a length and address which puts it within the buffer area where the directory sector will be placed.

Line 60 is a very important step. By knowing the format of the first directory sector and where this information is placed in memory, I know that the diskette name will be located starting at the hexadecimal address FD0H and will extend for eight bytes. This is what the statements in line 60 do. They redefine the dummy string, N1\$, to that location. Now, whenever I instruct the computer to PRINT N1\$, I will get the name of the diskette. This is similar to what is done in Listing 1. Line 110 calls the subroutine to read the directory sector and PRINTs the current name of the diskette on the screen.

Now, the fun part. Line 120 asks you to rename the diskette. This is where the MID\$= trick comes in. Using MID\$= places the first eight characters of the name you specify from N3\$ to the location of N1\$. Since the MID\$= function makes a direct replacement in memory, you now have your new name in the

correct location of the directory sector as it appears in the buffer. Please note that the location of the N1\$ is in protected memory, not reserved string space.

A few whiz-bang changes in our subroutine makes it a write disk-sector subroutine rather than a read subroutine (line 150 to line 160, depending on whether you have a Model I or III. See line 140.) Now the buffer is written to the correct sector of your diskette and it has a new name.

I must caution you to first try this program on a diskette that has been backed up. If a mistake has been made in coding, the program may render the diskette unreadable. Also, don't read the directory sector from one diskette and then try to place the information on another diskette. You will have a false granule-allocation table and the next time you try to add a program to the diskette, you will probably overwrite an existing program and destroy it.

Next time, I'll explain the subroutine which I used to read and write to the disk sectors. With a few modifications, you will be able to use that routine to read and write to any sector of any diskette; even on a disk with another DOS format.

My new Smith-Corona TP1 daisywheel printer has this peculiarity in interfacing with Radio Shack's Model I Scribes program. It will not "hear" two carriage returns in a row. In order to double space text, I must tell Scribes to use triple spacing. This messes up the line count for Scribes especially if one wants variable line spacing between paragraphs. How can I defeat this fault? —R. G., Tarzana, CA

Not having a TP1 printer, this question threw me for quite awhile. George Miller, from my computer club, came to the rescue by allowing me to try out different things on his printer and explaining how the printer operated. Essentially, the TP1 is like a typewriter. To control line spacing, the proper way is to set

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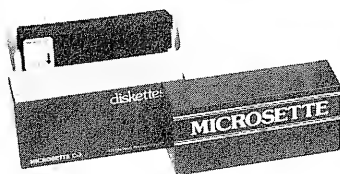
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BASIC bits

the linefeed spacing adjustment on the printer as you would with a typewriter.

George's TP1 is a 12-pitch printer. You didn't specify the pitch on yours, so things may work a little differently. On the 12-pitch, you can't even fool the printer by printing a space before the line feed. it has to be a printable character. With the exception of sending only one line feed control, ASCII 0D (zero D), the printer recognizes one less line feed than is sent. This is the cause of your problem.

In lieu of setting the line feed adjustment on the printer, I've written a small printer driver for you to use with disk Scripsit. Unfortunately, this driver will affect other printers adversely, giving them an extra line feed at times, so label your modified Scripsit as a special version. The driver is set up for the Model I original version of Scripsit. This replaces part of the copyright notice, "OPYRIGHT 1979 BY RADIO SHACK A D." You will also have to change three codes starting at each of the addresses 665EH, 6722H, 7A97H, and 7A9EH to CD0452. You'll have to have a program such as Superzap to make these changes on a Model I.

If your Scripsit is a different version, you may have to find some other location to put the printer driver. Search your program for either codes 32E837 or CD3B00 and change them to CD LSB MSB, the least and most significant bits of the location you enter the code. It is relocatable, but you will have to put an 00 at address 5203H where COUNT (Listing 4) is placed. A good location for the Model III version 3.2, is starting at location 58C0H. You'll also have to put the 00 code at 5203H in place of 28H and put a code 08H in place of 40H at 58B7H. In this version of Scripsit, the code CD3B00 occurs twice, starting at locations 606CH and 6074H. Change them to CDC058. You can use the PATCH command to enter your code with the Model III. The main printer driver is replacing codes of all 20H's.

Remember to send your requests for future column topics, questions and tips to me, care of *Basic Computing*, 3838 South Warner Street, Tacoma, WA 98409. Send a self-addressed stamped envelope and I'll try to give you a personal, handwritten reply as long as the answer is not too long and involved. Problems of general interest may be included in future BASIC Bits.

Listing 4—TP-1 Printer Driver for Model I Scripsit

5203	00100	ORG	5203H
5203 00	00110	COUNT	00
5204 E5	00120	PUSH	HL
5205 D5	00130	PUSH	DE
5206 210352	00140	LD	HL,COUNT
5208 FE0D	00150	CP	0DH
520B 2010	00160	JR	NZ,PRINT
520D 7E	00170	LD	A,(HL)
520E B7	00180	OR	A
520F 200C	00190	JR	NZ,PRINT
5211 3E0D	00200	LD	A,0DH
5213 34	00210	INC	(HL)
5214 CD3B00	00220	CALL	003BH
5217 CD3B00	00230	RETURN	003BH
521A D1	00240	POP	DE
521B E1	00250	POP	HL
521C C9	00260	RET	
521D F5	00270	PRINT	AF
521E AF	00280	XOR	A
521F 77	00290	LD	(HL),A
5220 F1	00300	POP	AF
5221 18F4	00310	JR	RETURN
0000	00320	END	

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—DEALER INQUIRIES WELCOME—

Captain 80

And the magic software machine

Bob Liddil, Contributing editor

This is serious business. Twitch, who is by far our most tenacious guest evil villain of the month, has not only escaped the confines of his ROM prison, he has also followed my exit from where I'd been held prisoner in the 6809 microprocessor. He successfully made his way from the CoCo in the lab to realtime. Worse, I am on my way to Community Hospital with whiplash and a sprung typing hand.

Max, meanwhile, was not sitting around idle. He had seen Twitch and company exit into realtime at the same instant as I, but could do nothing about it without running risk to me. He extrapolated the evil one's plan almost immediately and called for reinforcements among the Color Computer underground movement. These were the same brave freedom fighters who, two issues ago, spirited me away from the bad guys in the 6809 CPU core.

Twitch's objective was the Aggravation 80 BBS located in the local Radio Shack dealer store. Linked by open telephone line and equipped with an auto-dialer, this system could launch him into the phone systems of North America, giving him access to tens of thousands of programs used only for downloading. These frustrated, sometimes half-finished programs, would be the perfect recruits for his army of minions. They would take over realworld if they weren't stopped.

Max had to counteract the raid as quickly as possible. The freedom fighters from the CoCo wouldn't be enough. So he sent forth a call throughout all of TRS-80 land for recruits to fight a holy war to rid the universe (and this column) of Twitch once and for all. My house became headquarters for the final battle.

Max was the general.

And I, Field Marshal Von Eighty had just pulled on my uniform to go across town to review the troops. How did I find out what was happening? I never go *anywhere* without my Model 100 and a modem cable.

Because realworld was a strange place to him, Twitch's first disadvantage was in not knowing his way around town. You can get lost in Peterborough, New Hampshire easily if you're a stranger. He had scouts out looking for the location of the Radio Shack store while his main strike team lurked in the shadows of the old pizza parlor.

Our scouts had already located them. The Bear Patrol from Troop 834, which specializes in locating renegade computer programs and suppressing world takeovers, was right on the job, watching their every move.

Meanwhile, I inspected the volunteers. There were thirty adventures who'd answered the call. Many of them were from my book. Some were "Other Ventures" from Scott Adams, looking to make a name for themselves. Phantom Slayer had just arrived, as well as Danger Ranger, a program from Med Systems (now renamed Screenplay). This guy is so new that he was only half here, but he was dangerous looking just the way he was.

Others I recognized from past columns. Even a few old codgers from the Old Programs' Retirement Home were dressed out. It was a good army.

A new Color Computer arcade game, Ninja Warrior, had designed a weapon for each of the troops. Called a de-rez whip, it looked like a cat-o-nine-tails. That was a fooler.

Actually, it was a portable, power-charged, dimensional-transfer device that painlessly snapped its victim back into computerworld when touched. It had an insulated handle so as not to de-rez its owner. It was a deadly device.

Max briefed me on Twitch's plan. I shivered. If Twitch ever got access to those open systems and the thousands of twisted, frustrated downloads that lived in them, the world would be lost.

We swung into action. We deployed around the shopping center parking lot, well hidden, waiting for Twitch to appear. I'd taken the precaution of dialing up Aggravation 80 and recruiting Omniterm, the powerful intelligent-terminal program residing on drive two. He would act as forward spy and would prevent any terminal program in Twitch's lot from using the modem. The plan was simple. We'd let Twitch break into the Radio Shack store unopposed, surround him, and overwhelm him with sheer numbers, forcing him to surrender.

It should have worked. I had forgotten about my own downloads and the fifty programs for my new CoCo book, all of which were in residence in the back of the Radio Shack store. None of them had any experience with re-animation. Suddenly, the odds were even.

The element of surprise was ours. But what should have been an easy arrest exploded into a pitched battle. The minions of Twitch were armed with laser de-rez pistols, an infinitely more long-range weapon than the whips (though they did have the same effect). There were programs (in human form) running helter skelter. The night air crackled with laser bolts, snapped with de-rez whips, and popped with thunder-

claps as air rushed into the vacuum left by vanished warriors.

The enemy's weapons were superior and taking their toll. No warrior could re-enter the battle once he'd been thrown back to computerworld and my team was dwindling rapidly. Finally, there was only Me, completely surrounded by hostile programs. Some were angry over reviews I'd written, some just very angry, and all were just out of range of my whip.

The battle was lost. I was surrounded. The enemy had formed an impenetrable wall around me which parted for the master of evil. I clutched the handle of the de-rez whip as he drew nearer. The knuckles on my hand were white.

"We meet a final time, my troublesome Captain."

His voice was tinged with venom. His eyes burned with malevolence. I knew he would finish me if an unusual, but plausible, twist in the storyline didn't soon develop.

Is this the end of Captain Eighty? Will Twitch emerge victorious and rule the world? Can Max survive in the world as an orphan? Do I really have the nerve to drag this story out for one more month?

At the instant of my doom, a great bellowing sound reverberated through the parking lot. A de-rez whip cracked and a minion of Twitch imploded back into computerworld.

Minotaur! Huge, hulking creature from Madness and the Minotaur! He waded into the crowded throng, snapped loose a dozen of the enemy before they could fully absorb who he was.

"Get him!" shouted Twitch, exasperated at this new development.

For that brief instant, his attention was on the renewed battle and not me. Two men stepped out of the shadows and grabbed me by each arm. One had pointy ears and a greenish complexion.

"Scotty, beam us up," the other one said tersely.

(I can hear my editor groaning now.)

"Mr. Scott made special adjustments to the phasers," Captain Kirk explained as we left the transporter room running.

As soon as we were on the bridge

of the *U.S.S. Enterprise*, Kirk forgot about me and went to work.

"Phasers locked and ready," said Sulu.

"Fire phasers," said Kirk.

The mighty *U.S.S. Enterprise* raked the parking lot of the Radio Shack dealer store in Peterborough, New Hampshire with phaser fire that sent them tumbling back into computerworld. But Twitch was absorbing the deadly rays and getting bigger and bigger and bigger. I knew what I had to do.

Moments later, I stood in front of a now forty-foot tall Twitch. When he saw me, he reached down and scooped me up in his hand. He raised me up, even with his face.

"Now I have you," he sheered and let loose an evil laugh.

I let him have it right in the tonsils with a whole clip of milk-of-human-kindness gumdrops.

"Noooo!" he shouted. "Any kind of an ending but that!"

Captain Kirk obliged. I slipped between his massive fingers and crashed to the ground (one of these days I *have* to learn to fly). The *Enterprise* fired three photon torpedoes that impacted squarely in the center of his chest. They exploded in a mass of white-hot light. Twitch began to change into a rainbow of pure energy.

"You have completed my plan, Captain." Twitch raved, his voice

rattling the windows. "As long as there are arcade games for any computer, I will be right there, encouraging mindless twitching, making sure that adventure, education and simulation play second fiddle to *me*, Twitch, the magnificent."

With those words, Twitch went nova and exploded in a shower of multicolored sparks. Millions upon millions of tiny white light particles scattered to the winds.

The battle was not over. It had just begun, for each transformed energy bit was a part of Twitch and they homed in on every personal micro-, mini- and mainframe computer in realworld. Within seconds, there was a little Twitch lodged in every computer in existence.

The battle to put arcade games in their proper place has been transferred to the individual computerist. The best weapon to strike a balance between the different uses for computers is good, old-fashioned common sense.

You might be curious about which Star Trek game rescued the world from enslavement. It was none other than Jake Commander's CC TREK, currently manufactured in Camden, Maine, and sold by mail order.

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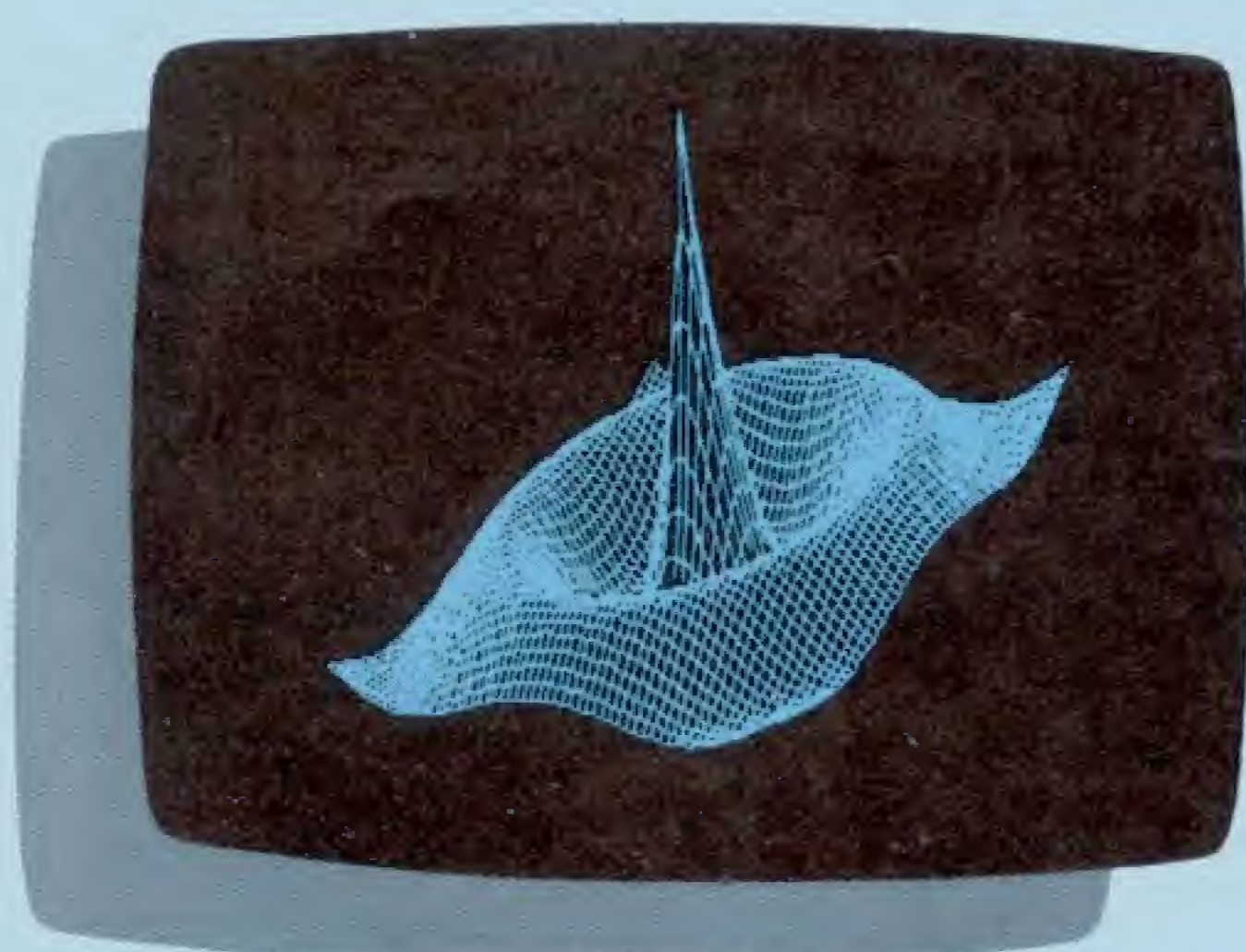
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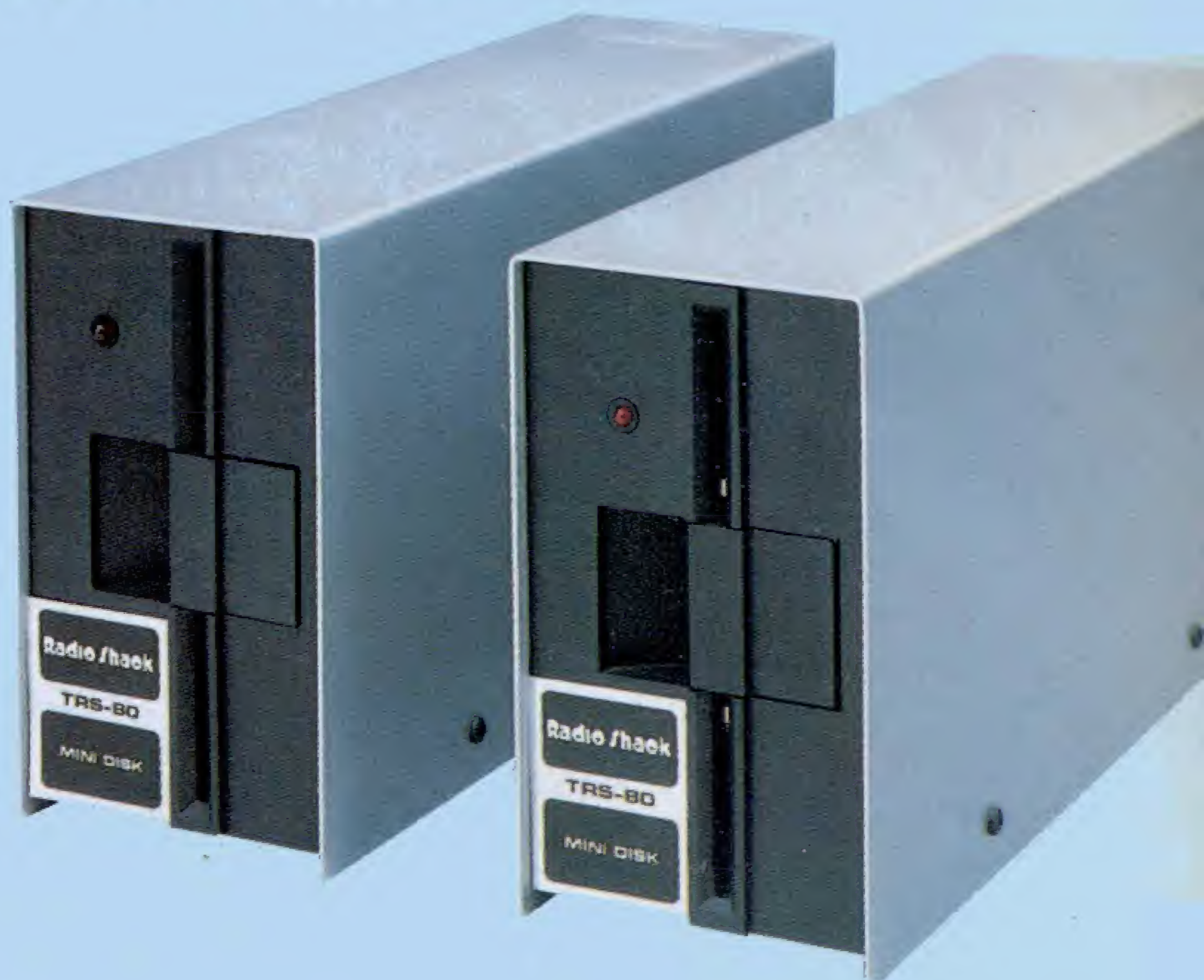
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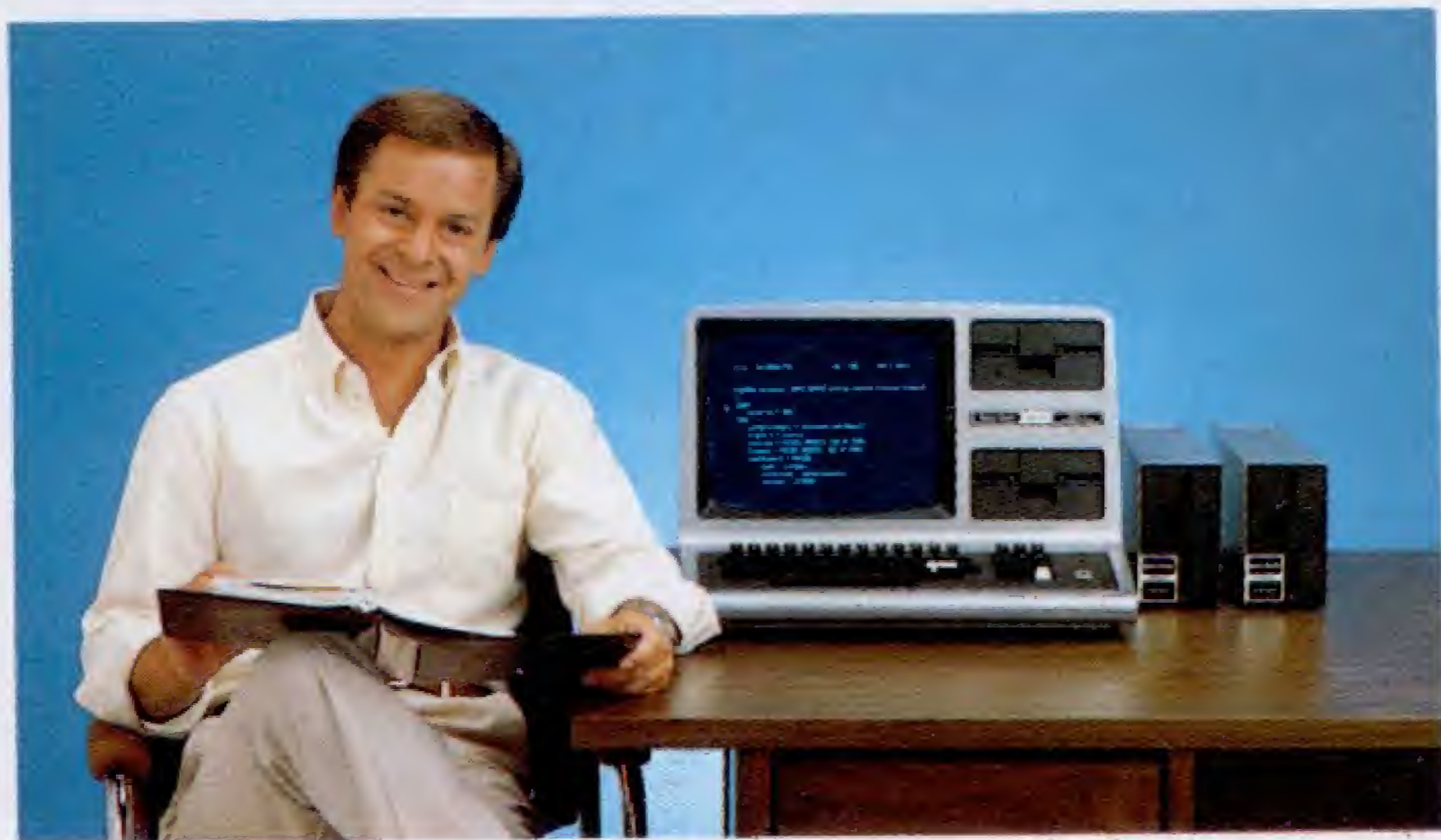
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For all models

Terry R. Dettmann, Associate editor

Last month, we started dealing with sequential files and what statements worked with them. This time, let's put them together to get some standard ways of using such files. We'll also introduce a useful function for dealing with such files.

Writing a File

Let's say that you have a bunch of information in memory, stored in a string array called A\$, which is dimensioned for 100 elements. Let's also assume that we have a number N which tells us how many of these strings are filled, always starting from number 0. We can write this information to disk by going through the following steps: (1) Open the desired file for output, (2) loop from 0 to N writing a single string each loop, and (3) closing the file.

These steps could be implemented in BASIC like this:

```
1000 REM -- WRITE FILE -  
1010 INPUT "FILENAME";FF$  
1020 OPEN "O", 1,FF$  
1030 FOR I=0 TO N  
1040 PRINT #1,A$(I)  
1050 NEXT I  
1060 CLOSE#1  
1070 RETURN
```

Notice the use of a string for the filename. This allows us to choose the name of the file when we need to and not before. Experienced programmers will notice that there is nothing to stop you from overwriting a file if you give it the wrong name. We'll get tricky later with ways to check to see if a file is in use.

Reading from the File

Once we've written a file, it would help if we can get the information back. If we know that there are N items on the file, we could write the program like this: (1) Open the file for input, (2) loop N times reading a string each time, and (3) close the file.

In BASIC, this comes out to be:

```
1100 REM -- READ THE FILE --  
1110 INPUT "FILENAME";FF$  
1120 OPEN "I",1,FF$  
1130 FOR I=0 TO N  
1140 INPUT#1, A$(I)
```

```
1150 NEXT I  
1160 CLOSE#1  
1170 RETURN
```

Here again, we have some problems not covered by our program. In this case though they are *very* significant. The major question is: How do we know that there are N items on the file?

The answer is that there is no way for us to know unless we keep a notebook or written record of it. Since we're fallible, even if we do enter the number somewhere, it's bound to be entered incorrectly.

One way to get around this is to store the number of items on the disk before the data. If we insert a line 1025 in the write-file procedure:

```
1025 PRINT#1, N
```

and a corresponding line 1125 in the read-file procedure:

```
1125 INPUT#1, N
```

then we're set. We always have the number because it's stored on the file.

With some computer systems, this is the only way to know what's there. However, Microsoft BASIC provides us with a very useful function that can simplify matters. This is the EOF (End of File) function.

EOF is a logical function in that it is TRUE if the file is at the end and FALSE otherwise. We can then use it in an IF statement to test for the end of the file. If we're going to use EOF, then we don't use line 1025 or 1125, but we add lines:

```
1125 N = -1  
1130 FOR I=0 TO 100  
1135 IF EOF(1) THEN 1160  
1145 N = N + 1
```

When the subroutine ends, if N is less than 0, nothing was read in, otherwise N is the number of the highest array location in use.

The new line 1130 is essential to the operation of this routine since it prevents us from going outside the bounds of the array A\$.

A simple mailing list program is included here as an illustration of one way of using the sequential file handling. Those who have been following the series will recognize a linked list, which is used in memory to keep everything in order. If you aren't familiar with this,

Files

don't let it bother you. We'll be going into it later in this series.

As a point of interest, this program was originally written on a Color Computer for demonstration of sequential file handling techniques. The version printed was loaded from a Color Computer to a Model II and ran *without* change.

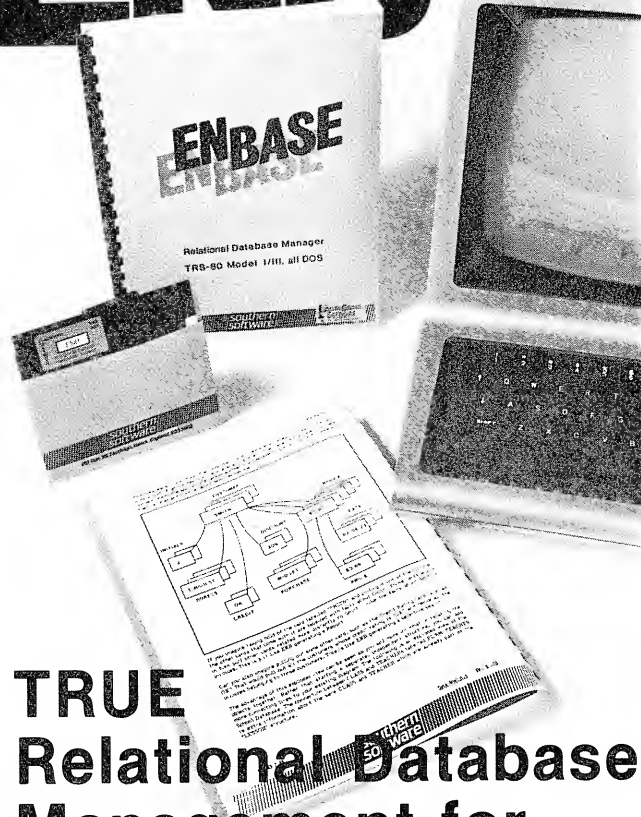
Program Listing for Files and Foibles

```

10 REM PROGRAM MAIL LIST
12 REM          NOTE: REMARK LINES WHICH
   END IN A DASHED LINE
13 REM          ARE NECESSARY TO
   THE PROGRAM, DO NOT
14 REM          DELETE THEM, OTH
   ER REMARKS MAY BE
15 REM          DELETED
20 REM INITIALIZE - - - - -
- - - - -
25 REM CLEAR SPACE FOR STRINGS
30 CLEAR2000
32 REM MAXIMUM 100 ENTRIES
35 MX=100
37 REM DECLARE ARRAYS FOR ENTRY DATA (D
   A$), PROMPTS (PMPT$),
38 REM          THE ACTUAL MAIL LIST (LS
   T$), AND THE LINKS (LK)
40 DIM DA$(10), PMPT$(10), LST$(MX,10), LK(
   MX)
45 REM READ THE PROMPTS FOR ENTRIES
50 FORI=1TO10:READ PMPT$(I):NEXTI
60 DATA LAST NAME,FIRST NAME
70 DATA ADDRESS,CITY,STATE,ZIP
80 DATA PHONE,BIRTHDAY,ANNIVERSARY
90 DATA ORGANIZATION
200 REM MENU - - - - -
- - - - -
210 CLS:PRINT"HOME MAILING LIST":PRINT:P
   RINT
220 PRINTTAB(5)"0. END PROGRAM"
230 PRINTTAB(5)"1. ADD/EDIT/DELETE"
240 PRINTTAB(5)"2. PRINT LISTS"
250 PRINTTAB(5)"3. MERGE OR ENTER NEW L
   IST"
300 REM GET SELECTION - - - - -
- - - - -
310 PRINT:PRINT
320 INPUT"SELECTION";S
325 REM NEED TO CHECK THE SELECTION FOR
   A VALID MENU OPTION
330 IF S<0 OR S>3 THEN PRINT"WRONG CHOIC
   E":GOTO320
350 REM EXECUTE SELECTION - - - - -
- - - - -
360 IF S=0 THEN CLS:END
370 ON S GOSUB 1000,2000,3000
390 GOTO200

```

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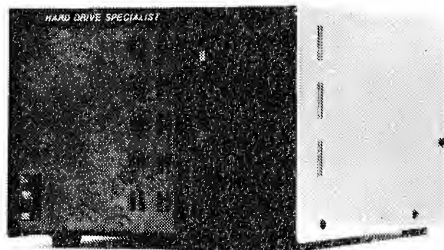
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Files

```

400 REM GET A DATA FILE - - - - -
- - - - -
410 CLS:INPUT"DO YOU WANT A NEW FILE";YN$
$
420 IF LEFT$(YN$,1)="N" THEN RETURN ELSE
  IF LEFT$(YN$,1)<>"Y" THEN 410
425 REM GET THE FILENAME AS A STRING
430 INPUT"FILENAME";FF$
440 OPEN"I",1,FF$
445 REM N WILL BE THE NUMBER OF RECORDS
  READ
450 N=0
455 REM CHECK FOR END OF FILE FIRST
460 IF EOF(1) THEN CLOSE:RETURN
465 REM READ IN 1 RECORD OF TEN FIELDS
470 N=N+1
480 FORI=1TO10:LINE INPUT#1,LST$(N,I):NE
  XTI
482 REM ADD THE ITEM TO THE LINKED LIST
483 REM      NOTE: ITEMS ON DISK ARE
  ALWAYS SORTED ORDER
485 LK(N-1)=N:PRINT LST$(N,1):GOTO460
500 REM ENTER DATA ITEMS - - - - -
- - - - -
502 REM CF IS A CHANGE FLAG
505 CF=0:CLS
507 REM LOOP OVER THE 10 INPUT FIELDS
510 FORI=1TO10:PRINT PMPT$(I);
512 REM IF WE'RE EDITING (ED=1) WE'LL PR
  INT
513 REM WHAT'S ALREADY THERE AND ASK FOR
  CHANGES
515 IF ED=1 THEN PRINT": ";DA$(I):PRINT
  "CHANGES: ";
517 REM IF NOTHING IS ENTERED INTO X$ TH
  EN CONTINUE ON
520 INPUTX$:IF X$="" THEN NEXTI:RETURN
525 REM IF 'END' WAS ENTERED, WE'RE DONE
530 IF X$="END" THEN RETURN
535 REM OTHERWISE RECORD THE CHANGE
540 DA$(I)=X$:CF=1:NEXTI
550 RETURN
560 REM WAIT HERE - - - - -
- - - - -
570 PRINTSTRING$(31,"-")
575 REM WAITS FOR AN ENTER KEY HERE
580 INPUT"PRESS ENTER TO CONTINUE";YN$:R
  ETURN
600 REM STORE DATA IN LIST - - - - -
- - - - -
605 REM FIRST FIND SPACE FOR THE ITEM
610 GOSUB700
615 REM PUT THE NEW ITEM IN THAT SPACE
620 FORI=1TO10:LST$(LC,I)=DA$(I):NEXTI
625 REM NOW ADD IT TO THE LINKED LIST
630 GOSUB800
640 RETURN

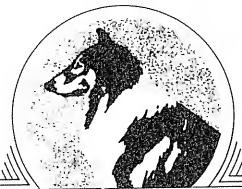
```

Files

```

650 REM SAVE DATA - - - - -
651 CLS
655 INPUT"SAVE FILE";YN$:IF LEFT$(YN$,1)
="N" THEN RETURN ELSE IF LEFT$(YN$,1)<>"
Y" THEN 655
660 INPUT"FILENAME";FF$
661 OPEN"O",1,FF$
662 REM STEP THROUGH THE LIST STARTING W
ITH ITEM 0
663 REM WHICH IS THE HEAD OF THE LIST
665 LST=0
668 REM GET THE CURRENT LINK, IF IT'S ZE
RO, WE'RE AT THE END
670 LK=LK(LST):IF LK=0 THEN CLOSE:RETURN
672 REM PRINT THE ITEM TO DISK
675 FORI=1TO10:PRINT#1,LST$(LK,I):NEXTI
677 REM PRINT THE NAME JUST TO SHOW WE'R
E DOING SOMETHING
680 PRINTLST$(LK,1)
682 REM UPDATE THE LAST LINK VARIABLE
685 LST=LK:GOTO670
700 REM GET SPACE IN LIST - - - - -
- - - - -
702 REM IF THE LIST IS ALREADY FULL, WE
CAN'T ADD ANY MORE
705 IF N>=MX THEN LC=0:RETURN
706 REM OTHERWISE ADD IT TO THE END
707 REM NOTE: DELETIONS AREN'T T
AKEN INTO ACCOUNT HERE
710 N=N+1:LC=N:RETURN
800 REM LINK AN ITEM INTO LIST - - - - -
- - - - -
805 REM WE MUST FIND THE PLACE TO PUT TH
E ITEM ALPHABETICALLY
806 REM SO WE SEARCH FOR THE PLA
CE WHERE IT FITS
807 REM STARTING AT THE BEGINNIN
G
810 LST=0
815 REM IF WE'RE AT THE END OF THE LIST,
ADD IT THERE
820 LK=LK(LST):IFLK=0 THEN LK(LST)=LC:LK
(LC)=0:RETURN
825 REM IF THE CURRENT LOCATION IS AFTER
THE ONE WE'RE ADDING
826 REM THEN ADD THE NEW ITEM BE
FORE IT
830 IF LST$(LK,1)>LST$(LC,1) THEN LK(LC)
=LK(LST):LK(LST)=LC:RETURN
835 REM CONTINUE THE SEARCH
840 LST=LK:GOTO820
900 REM SEARCH FOR NAME - - - - -
- - - - -
905 REM START AT THE BEGINNING
910 LST=0
915 REM IF WE GET TO THE END, WE HAVEN'T
FOUND IT

```



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Files

```

920 LK=LK(LST):IF LK=0 THEN RETURN
925 REM IF WHAT WE WANT IS PART OF THE C
CURRENT ENTRY,
926 REM          THEN WE'VE FOUND IT
930 IF INSTR(LST$(LK,1),NM$)<>0 THEN RET
URN
935 REM IF THE CURRENT ITEM IS GREATER T
HAN WHAT WE WANT
936 REM          THEN IT WON'T BE IN THE
LIST AT ALL
940 IF LST$(LK,1)>NM$ THEN LK=0:RETURN
945 REM CONTINUE THE SEARCH
950 LST=LK:GOTO920
1000 REM ADD/EDIT/DELETE - - - - -
- - - - -
1010 CLS:PRINT"ADD/EDIT/DELETE":PRINT:PR
INT
1015 REM          IF FF$ HAS NOTHING IN IT
, THEN THERE'S NO FILE
1016 REM          PRESENTLY IN MEMORY
1020 IF FF$="" THEN GOSUB400
1030 PRINT"<A>DD <E>DIT <D>ELETE <R>ETUR
N"
1040 INPUT"SELECTION";S$
1050 IF S$="A" THEN GOSUB1100
1055 IF S$="E" THEN GOSUB1200
1060 IF S$="D" THEN GOSUB1300
1070 IF S$="R" THEN GOSUB650:RETURN
1080 GOTO1030
1100 REM ADD PROCEDURE - - - - -
- - - - -
1105 REM          ENTER THE DATA ITEMS
1110 GOSUB500
1115 REM          IF WE DIDN'T ENTER AN IT
EM THEN WE'RE DONE
1120 IF CF=0 THEN RETURN
1125 REM          NOW STORE THE ITEM IN TH
E LIST
1130 GOSUB600
1140 GOTO1100
1200 REM EDIT PROCEDURE - - - - -
- - - - -
1205 REM          SET ED TO 1 TO SAY WE'RE
EDITING
1210 ED=1:CLS:PRINT"EDIT ENTRIES"
1215 REM          WHAT DO WE WANT?
1220 INPUT"LAST NAME (END WHEN DONE)";NM
$
1225 IF NM$="END" THEN ED=0:RETURN
1228 REM          FIND THE NAME WE WANT
1230 GOSUB900
1232 REM          SORRY, NOT IN THE LIST
1235 IF LK=0 THEN PRINT"NOT FOUND":GOTO1
220
1238 REM          TRANSFER TO THE EDITING
DATA ARRAY
1240 FORI=1TO10:DA$(I)=LST$(LK,I):NEXTI
1245 REM          NOW USE THE ENTER ITEMS
PROCEDURE
1250 GOSUB500
1255 REM          IF THE ITEM WAS CHANGED,
THEN REPLACE IT
1260 IF CF=1 THEN FORI=1TO10:LST$(LK,I)=
DA$(I):NEXTI
1270 GOTO1210
1300 REM DELETE PROCEDURE
1310 CLS:PRINT"DELETE ITEMS"
1320 INPUT"LAST NAME (END WHEN DONE)";NM
$
1330 IF NM$="END" THEN RETURN
1335 REM          FIND THE ITEM TO DELETE
1340 GOSUB900
1350 IF LK=0 THEN PRINT"NOT FOUND":GOTO1
320
1355 REM          SHOW THE ITEM FOUND AND
CHECK FOR DELETION
1360 CLS:FORI=1TO10:PRINTPMPT$(I);TAB(15
)LST$(LK,I):NEXTI
1370 PRINTSTRING$(31,"-")
1380 INPUT"DELETE THIS ITEM";YN$
1390 IF LEFT$(YN$,1)="N" THEN 1300 ELSE
IF LEFT$(YN$,1)<>"Y" THEN 1380
1400 LK(LST)=LK(LK):GOTO1300

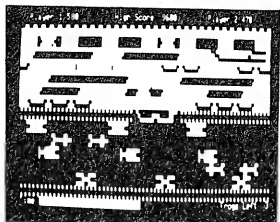
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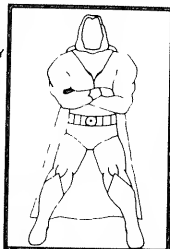
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Files

```

2000 REM PRINT LISTS - - - - -
- - - - -
2005 REM          IS THERE A FILE IN MEMOR
Y?
2006 REM          IF NOT, GET ONE
2010 IF FF$="" THEN GOSUB400
2100 REM PRINT LIST
2105 REM          PRINT IN SORTED ORDER
2110 LST=0
2115 REM          GET THE NEXT LINK
2120 LK=LK(LST):IF LK=0 THEN RETURN
2125 REM          PRINT THE CURRENT ITEM
2130 GOSUB2200:LST=LK:GOTO2120
2200 REM PRINT ITEM - - - - -
- - - - -
2210 CLS
2215 REM          PRINT AN ITEM ON THE SCR
EEN
2220 FORI=1TO10:PRINTPMPT$(I);TAB(15)LST
$(LK,I):NEXTI
2225 REM          NOW WAIT FOR AN ENTER KE
Y
2230 GOSUB560:RETURN
3000 REM MERGE/SPLIT LISTS - - - - -
- - - - -
3010 CLS:PRINT"MERGE OR INPUT LIST"
3020 INPUT"MERGE LIST";YN$
3030 IF LEFT$(YN$,1)="N" THEN YN=1 ELSE
IF LEFT$(YN$,1)="Y" THEN YN=0 ELSE 3020
3035 REM          GET A LIST IF NOT MERGIN
G
3040 IF YN=1 THEN GOSUB400:RETURN
3050 CLS:INPUT"FILENAME";FF$
3055 REM          OPEN THE NEW FILE
3060 OPEN"I",1,FF$
3065 REM          STANDARD INPUT PROCEDURE
3070 IF EOF(1) THENCLOSE:RETURN
3075 REM          GET SPACE FOR THE NEW IT
EM, PROVIDE FOR A FULL MEMORY
3080 GOSUB700:IF LC=0 THEN PRINT"LIST FU
LL":CLOSE:RETURN
3085 REM          READ THE NEW ITEM
3090 FORI=1TO10:LINE INPUT#1,LST$(LC,I):
NEXTI
3092 REM          PRINT THE NAME JUST SO W
E CAN SEE SOMETHING
3095 PRINTLST$(LC,1)
3097 REM          LINK THE NEW ITEM INTO T
HE EXISTING LIST
3100 GOSUB800
3110 GOTO3070
3200 REM SPLIT LIST - - - - -
3205 REM          CAN YOU WRITE THIS PROCE
DURE????
3206 REM          AND CAN YOU ADD IT TO TH
E CODE HERE?
3210 RETURN

```

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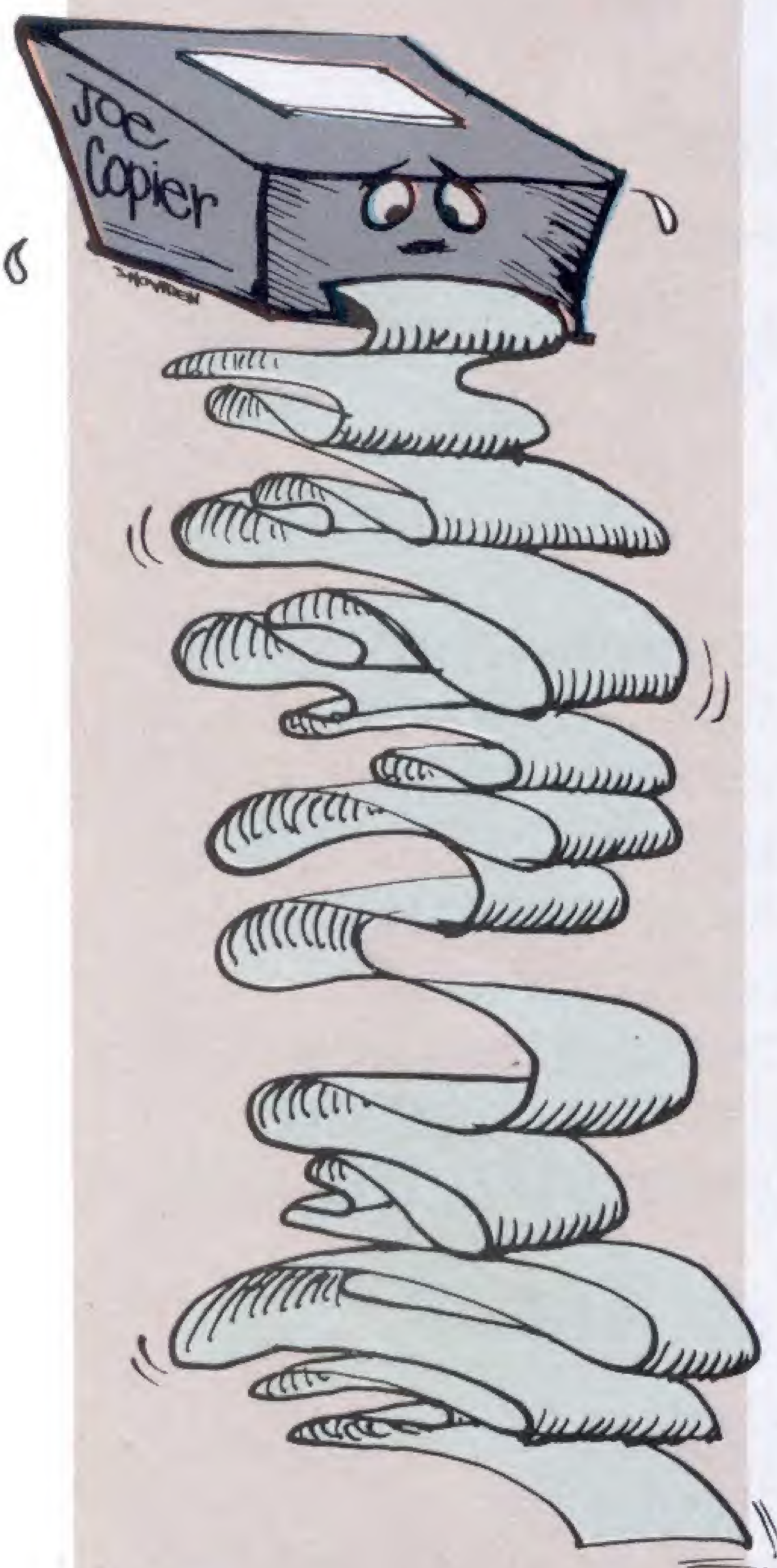
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Model I

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I hate BASIC program line listings! Especially the way I write program lines: long, complex and without a memory-grabbing space in sight. They are just plain hard to read. That is, until now. Oh, yes, I still write the same way, but now I'm LLISTing using PAGELIST/CMD and it makes all the difference.

The Nov/Dec 1980 *80-U.S. Journal* featured an article on LLIST/CMD, a 'filter' for hardcopy BASIC line listings that gives the user a way to limit the length of any one printed line and also provides subsequent line indentations. This right-justified LLIST is good, but it was obvious that more needed to be done to satisfy me. So, I grabbed my modified-for-disk Editor-Assembler, Z-80 programming book, wish list of expected results, and went to work.

First, I decided to use LLIST/CMD as the basis for my new program. Okay, what was at the top of my need list? Pagination.

Pagination is the automatic halting of a hardcopy printout at the bottom of a page of material. This is important for a couple of reasons. One, paginated line listings are easier to store as a flat file than continuous roll ones. Second, if you are like me, you run off periodic 'proofs' of work in progress to check all of that good logic. I know, some of you folks sit down and flowchart, program in BASIC away from the

keyboard, and don't have to see what you've done at the machine. But, I'm one who loves ideas more than all that workup work—go with the flow at the keyboard, I say, and see what happens! That's what interpreted BASIC's all about, right?

Periodic proofs of line listings use up valuable roll paper. I've found a source of 'used' paper (one side clear) for this purpose, and since it isn't in rolls, I'm stuck if I don't have pagination. If you aren't into recycling, here's one area where the savings can come in a hurry. Anyway, PAGELIST/CMD paginates or not, as you select.

After programming pagination into PAGELIST/CMD, it was time to 'open up' the listings for readability. The answer to this need is called linefeed-on-colon. Even the longest, most complex BASIC lines have colons to separate statements. Here is where money can be made in readability.

Let's look at the anatomy of the assembly language program and see what's going on here (Listing 1).

Since PAGELIST/CMD is meant to be used under BASIC, I added a step in the initialization sequence of the former LLIST/CMD. Now, the PAGELIST/CMD execution module is automatically protected in high RAM by resetting the DOS top of

memory pointer at 4049H. Lines 810 and 820 do this.

Lines 830-890 prompt the user for a maximum line length. The default value is 64 characters. An <ENTER>, instead of a number, in response to this query, is an acceptance of the default value and advances the program to a prompt for number of indentation spaces desired.

Lines 900-990 ask for and get the space response. Note that lines 950-970 insure that line length exceeds spaces requested. These two requests and queries are almost the same as programmed in LLIST/CMD.

Lines 1000-1060 are new code, and request a yes or no response to whether pagination is desired. If it is, the indicator byte at 'PMODE' is set to one. An <ENTER> or 'N' answer advances the program to the next request, leaving pagination off.

Lines 1070-1140 ask for a yes or no response to activating the colon-on-linefeed option. A 'Y' causes the colon comparison code to be completed in the execution module.

Line 1150 is the end of initialization and jumps the program to DOS READY.

The INPUT routine, lines 1160-1320, is all new code as compared to LLIST/CMD. First, it uses the Level 2 input routine at address 0040H to wait for, and get, a user response. An RST 16 is executed to analyze the input. If a number is found, the carry flag is set and a RETurn is executed. Notice in the code after CALL INPUT (in the initialization area), how the carry flag is used to direct traffic.

If no decimal number is present, a check for an <ENTER> is made. If found, the Z flag is set and a RETurn is executed. The Z flag also is set for an 'N' response. Notice again, how the Z flag directs program flow in the initialization module.

If neither number, <ENTER> nor 'N' is found to be input, a 'Y' is looked for. No 'Y', no RETurn—an 'Input Error!' message is displayed.

The messages in PAGELIST/CMD are printed by a CALL to 4467H. This is a generalized DOS print-to-screen routine which recognizes a 03H or 0DH stop byte. I added a few touches to the request messages for clarity. Lines 1360-

1500 are the messages.

PAGELIST/CMD is really two separate programs, if you will. The initialization module beginning at label 'START' is actually a program that configures the execution module according to the user's wishes. Once used, the initialization module becomes irrelevant to PAGELIST operation. Notice that it is ORGED low in memory and really could be almost anywhere. The execution module starting at label 'LLIST', however, is the workhorse routine of PAGELIST.

PAGELIST's execution module is a 'filter'. Its job is to sit between the printer and the ROM LLIST/LPRINT code and insure that hardcopy printing is carried out according to the user's desires. Inserting PAGELIST into the line of events is accomplished by lines 750-780 of the initialization module.

Okay, now that our gatekeeper to the printer is on the job, how does he do what we have asked him to do?

First, the C register contains the byte enroute to the printer. Lines 1520-1590 compare that byte with three codes of interest; carriage return, top of form and quote mark. The first two cause execution to be routed to a few bytes of code that reset the line character counter back to zero, then prints the code. Remember, we've specified a maximum line length acceptable, so that every time a linefeed is executed, the character counter

must be reset to a starting value.

The recognition of a quote mark causes a swapping of bytes at FF50H. This is Mister Toggle. He gets the present value of the comparison byte at location 'CKQTE+1' (address FF4AH), and reverses it. If it is a zero, he makes it a one, a one becomes a zero. Why? Because that byte controls the linefeed on colon function later on, as we will see. If none of the three comparisons are found to be true, the character counter is incremented by one and another comparison is attempted.

The byte at 'CLCPR' plus one, is initialized to the ASCII code for a colon upon user selection of the linefeed-on-colon option. If no colon is detected, execution falls through to check for maximum line length. If the line is at that length, a carriage return is effected. If not, the byte is printed normally, and we're back to line 1520.

If a colon is detected, a jump is made to 'CKQTE'. Okay, if Mister Toggle is a one, execution is routed back upstream for normal handling. Why? Because a one will appear only if just one quote mark has been encountered, meaning that a colon has been detected within a quoted string. Since the only colons of interest are between BASIC program statements, no action is taken. If Mister Toggle is a zero, an even number of quotes (or none at all) has been detected, and the colon

Listing 1 — PAGELIST Assembly Language Program

```
00100 ;PAGELIST/CMD
00110 ;
00120 ; BY RIK KARLSSON
00130 ; 3103 FOX MILL ROAD
00140 ; OAKTON,VIRGINIA 22124
00150 ;
00160 ;THIS IS A GREATLY MODIFIED VERSION OF LLIST/CMD
00170 ;WHICH APPEARED IN 80-U.S. MAGAZINE OF NOV/DEC 1980.
00180 ;THIS PROGRAM ONLY RUNS UNDER A DISK OPERATING SYSTEM.
00190 ;
00200 ;THE KEY DIFFERENCES BETWEEN THIS PROGRAM AND LLIST/CMD
00210 ;INCLUDE THE PAGINATION OPTION, LINEFEED ON COLON OPTION,
00220 ;AND THE USE OF SOME DOS ROUTINES TO PRINT THE MESSAGES.
00230 ;THE INPUT ROUTINE CALLS LEVEL-II ROM AS WELL. WHEN
00240 ;INITIALIZING, <ENTER> ALWAYS ADVANCES THE USER TO THE
00250 ;NEXT INPUT PARAMETER THUS FORCING A REVIEW AND
00260 ;ACCEPTANCE OF EACH ONE.
00270 ;
00280 ;SUBROUTINES TO HANDLE THE PAGINATION OPTION ARE ADDED
00290 ;AS 'PGREQ','MODE' AND 'HOLD.' LINEFEED ON COLON IS
00300 ;ACTIVATED BY 'COLON' AND RECOGNIZED AT 'CLCPR.'
00302 ;THE BYTE AT 'CKQTE'+1 IS TOGGLED SO THAT NO LINEFEED
00304 ;WILL OCCUR ON A COLON ENCLOSED IN QUOTES.
```

Pagelist

is acted upon.

Now, execution falls through to carriage return, reset character counter, and check-page-length-in-lines subroutines. Line 1840, 'CALL MODE', executes a subroutine that increments the counter for number of lines printed, then checks for end of page. If 57 lines is detected, a message is displayed, and a wait for <ENTER> loop begun. <ENTER> causes execution to continue by entering spaces at the head of the next line and, finally, the next character being printed. Whew!

And, it happens that way for each character printed, folks. "But, what if I want to change the parameters? Do I have to go back to DOS and start all over again?" No, Virginia, there is a Santa Claus in two forms, PAGELIST/BAS, a companion program, or direct command input of parameters. The direct command input mode is fully covered in the lead in (Listing 1, lines 430-690) documentation to the assembly language program listing. In most cases, only the line counter reset is actually needed in practice. To reset the line counter to zero following completion of a full program line listing, 'POKE &HFF94,0.' For those few times when a more extensive reconfiguration is required, the PAGELIST/BAS BASIC program is more thorough, capable and automatic.

Here is what the PAGELIST/BAS program is all about.

Recall that PAGELIST/CMD was composed of two separate programs, an initialization/configuration module and an execution module. The execution module is the only part of the composite left operative in memory after initialization.

PAGELIST/BAS (Listing 2) is RUN under BASIC and is a BASIC language configuration module for the PAGELIST machine code execution module. When RUN, it first checks to see that the execution module is indeed active. This is accomplished by examining the lineprinter device control block (DCB). If the DCB printer driver address points to the start address of the execution module, we're in business. If not, the fact is reported, and the BASIC program is terminated. To use PAGELIST in this case, you will have to start over

66 Basic Computing

```

00310 ;
00320 ;ALSO ADDED IS AN AUTOMATIC MEMORY PROTECT FEATURE
00330 ;AT INITIALIZATION WHICH SETS THE DOS MEMORY SIZE
00340 ;POINTER AT 4049H TO THE START OF THE EXECUTION MODULE
00350 ;MINUS ONE BYTE. THE USER CAN NOW ENTER BASIC, LOAD AND
00360 ;RUN A PROGRAM AND THEN BE ABLE TO LLIST WITH THE
00370 ;PARAMETERS SET WITHOUT SETTING MEM SIZE. IT MUST BE
00380 ;NOTED THAT SINCE THIS ROUTINE RUNS AS A FILTER
00390 ;BETWEEN THE BASIC ROM ROUTINES AND THE PRINTER
00400 ;OUTPUT ROUTINE, ANY PRINTING TO HARDCOPY BE AFFECTED
00410 ;BY PARAMETERS SET FOR PAGELIST.
00420 ;
00430 ;PAGELIST/CMD PARAMETERS CAN BE RESET FROM BASIC. THIS
00440 ;IS IMPORTANT IF THE USER LLISTS MORE THAN ONE PROGRAM.
00450 ;THE PAGINATION COUNTER MUST BE RESET TO ZERO BEFORE
00460 ;ATTEMPTING ANOTHER LLIST. TO RESET THE PAGE COUNTER
00470 ;TO ZERO, IN BASIC COMMAND MODE, ENTER:
00480 ;      POKE &HFF99,0
00490 ;
00500 ;TO RESET THE NUMBER OF SPACES FROM BASIC, ENTER:
00510 ;      POKE &HFF5C, <NUMBER OF SPACES>
00520 ;
00530 ;NOTE: THE NUMBER OF SPACES MUST BE LESS THAN LINE LENGTH
00540 ;
00550 ;TO RESET THE LINE LENGTH FROM BASIC, ENTER:
00560 ;      POKE &HFF39, <LENGTH DESIRED>
00570 ;
00580 ;TO TURN OFF THE PAGINATION FEATURE FROM BASIC, ENTER:
00590 ;      POKE &HFF98,0
00600 ;
00610 ;TO RESET THE NUMBER OF LINES PER PAGE, ENTER:
00620 ;      POKE &HFF76, <LINES DESIRED>
00630 ;
00640 ;TO NEGATE TO LINEFEED ON COLON FEATURE, ENTER:
00650 ;      POKE &HFF34,0
00660 ;
00670 ;THE COMPANION PROGRAM PAGELIST/BAS WILL ALLOW AUTOMATIC
00680 ;ACCESS TO AND CHANGE OF PAGELIST/CMD PARAMETERS UNDER
00690 ;BASIC. THE PROGRAM IS PRESENTED SEPARATELY.
00700 ;
00710 ;      MARCH 28, 1981  ROLLINGCREST
00720 ;
00730 ;
00740      ORG      8000H      ;ORIGIN INIT MODULE
00750 START LD      HL,(4026H) ;GET LP DRIVER ADDRESS
00760      LD      (DRIVER+1),HL ;
00770      LD      (DRIV2+1),HL ;
00780      LD      (ENDIT+1),HL ;
00790      LD      HL,LLIST ;EXECUTION MODULE START
00800      LD      (4026H),HL ;
00810      DEC     HL ;BACK ONE SPACE
00820      LD      (4049H),HL ;PROTECT MEMORY
00830 LINE LD      HL,MSG0 ;FIRST MESSAGE
00840      CALL    4467H ;DISPLAY IT
00850      CALL    INPUT ;GET RESPONSE
00860      JR      NC,SPREQ ;BYE
00870      CALL    1E5AH ;CONVERT TO HEX
00880      LD      A,E ;GET LSB
00890      LD      (MAXLEN+1),A ;SET LINE LENGTH VALUE
00900 SPREQ LD      HL,MSG1 ;NEXT MESSAGE
00910      CALL    4467H ;DISPLAY IT
00920      CALL    INPUT ;GET RESPONSE
00930      JR      NC,PGREQ ;BYE
00940      CALL    1E5AH ;CONVERT TO HEX
00950      LD      A,(MAXLEN+1) ;GET LINE LENGTH
00960      CP      E ;COMPARE TO SPACES
00970      JR      C,SPREQ ;TOO MANY, TRY AGAIN
00980      LD      A,E ;OKAY, GET LSB
00990      LD      (NUMSPC+1),A ;SET SPACES NUMBER
01000 PGREQ LD      HL,MSG2 ;PAGINATION REQUEST
01010      CALL    4467H ;DISPLAY IT
01020      CALL    INPUT ;GET (Y/N) RESPONSE
01030      JR      C,PGREQ ;A NUMBER INPUT
01040      JR      Z,COLON ;A 'N' INPUT
01050      LD      HL,PMODE ;A 'Y' INPUT
01060      INC     HL ;SET MODE BYTE TO 'ON'
01070 COLON LD      HL,MSG3 ;COLON ON REQUEST

```

from DOS.

When PAGELIST is active, the BASIC program reports the total present configuration of the execution module. Figures 1 and 2 show typical screen displays.

The user is offered a chance to change the parameters. Figure 3 shows a typical question and response sequence. An <ENTER> in response to any query is accepted as a bye, and that parameter is left unchanged. After the last query is answered, the program automatically cycles to the initial report mode for checking by the user. Answering an 'N' to the change parameters query ENDS the program by DELETing PAGELIST/BAS from memory.

The way I use PAGELIST/BAS is to maintain it in ASCII form on disk (SAVE "PAGELIST/BAS: d", A"). In this way, it can be MERGED with any BASIC program in memory, and RUN without harm to it. Of course, the line numbering system of one through 10 was chosen for this

8054 CD6744	01080	CALL	4467H	;DISPLAY IT
8057 CD6780	01090	CALL	INPUT	;GET (Y/N) RESPONSE
805A 38F5	01100	JR	C,COLON	;A NUMBER INPUT
805C 2806	01110	JR	Z,QUIT	;A 'N' INPUT
805E 2134FF	01120	LD	HL,CLCPR+1	;WHERE COMPARE BYTE GOES
8061 3E3A	01130	LD	A,':'	;COLON ASCII CODE
8063 77	01140	LD	(HL),A	;PUT INTO PLACE
8064 C32D40	01150	QUIT	402DH	;INIT DONE, GO TO DOS
8067 219580	01160	INPUT	LD HL,BUFF	;POINT TO INPUT BUFFER
806A 0603	01170	LD	B,3	;MAX INPUT LENGTH
806C CD4000	01180	CALL	0040H	;WAIT FOR RESPONSE
806F 2B	01190	DEC	HL	;BACK ONE
8070 D7	01200	RST	16	;CHECK OUT INPUT
8071 D8	01210	RET	C	;A NUMBER, GO BACK
8072 D60D	01220	SUB	0DH	;A <CR>?
8074 C8	01230	RET	Z	;YES, GO BACK
8075 D641	01240	SUB	41H	;A 'N'?
8077 C8	01250	RET	Z	;YES, GO BACK
8078 FE0B	01260	CP	0BH	;A YES?
807A 2002	01270	JR	NZ,ERROR	;NO, ANSWER UNACCEPTABLE
807C 3C	01280	INC	A	;SET FLAGS
807D C9	01290	RET		;GO BACK
807E 218680	01300	ERROR	LD HL,ERRMSG	;POINT TO ERROR MESSAGE
8081 CD6744	01310	CALL	4467H	;DISPLAY IT
8084 18E1	01320	JR	INPUT	;GO BACK FOR INPUT
8086 49	01330	ERRMSG	DEFM 'INPUT ERROR! >'	
8094 03	01340	DEFB	03H	;TERMINATOR
0004	01350	DEFS	4	;MAX OF 4
8099 1CLF	01360	MSG0	DEFW 1F1CH	;CLEAR SCREEN
809B 20	01370	DEFM	'	PAGELIST PROGRAM'
80B4 1A1D	01380	DEFW	1D1AH	
80B6 20	01390	DEFM	'	BY RIK KARLSSON'
80CE 1A1D	01400	DEFW	1D1AH	
80D0 2D	01410	DEFM	'	
80F2 1A1D	01420	DEFW	1D1AH	

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Pagelist

reason. Just insure that the resident BASIC programs, with which PAGELIST/BAS will be merged, have lines beginning above number 10.

Not to belabor the obvious, but there may be occasions when a 'high' version of PAGELIST/BAS is desired—when a BASIC program to be LLISTed uses lines 1-10. You could make a PAGELIST/BAS with line numbers from, say 65520-65529. In this case, to operate it, MERGE, then 'RUN 65520' rather than RUN as the start command.

So, there you have it. Assemble PAGELIST/CMD, then key in and save PAGELIST/BAS (with ASCII option), and you are on your way to meeting your conviction. And, you know, it really is a better way!

Figure 1

PAGELIST Parameters

```
PAGINATION <OFF>
LINEFEED ON COLON <OFF>
LINE LENGTH = 64
SPACES = 2
CHANGE PARAMETERS (Y/N)?
N
READY
<<
```

Figure 2

PAGELIST Parameters

```
PAGINATION <ON> — LINES
PER PAGE = 57
LINE COUNTER = 0 (zero)
LINEFEED ON COLON <ON>
LINE LENGTH = 64
SPACES = 2
CHANGE PARAMETERS (Y/N)?
N
READY
<<
```

Figure 3

PAGELIST Parameters

```
PAGINATION <ON> — LINES
PER PAGE = 57
LINE COUNTER = 33
LINEFEED ON COLON <ON>
LINE LENGTH = 64
SPACES = 2
CHANGE PARAMETERS (Y/N)?
Y
DISCONNECT PAGELIST/CMD
FROM SYSTEM (Y/N)? N
CHANGE PAGINATION STATUS
(1=ON 0=OFF)? 1
RESET LINE COUNTER (Y/N)? Y
CHANGE LINES PER PAGE? 57
```

80F4 45	01430	DEFM	'ENTER MAX LINE LENGTH (DEFAULT=64)'
8116 03	01440	DEFB	03H ;TERMINATOR
8117 45	01450 MSG1	DEFM	'ENTER NUMBER OF SPACES (DEFAULT=5)'
8139 03	01460	DEFB	03H ;TERMINATOR
813A 50	01470 MSG2	DEFM	'PAGINATION DESIRED (Y/N)?'
8153 03	01480	DEFB	03H ;TERMINATOR
8154 4C	01490 MSG3	DEFM	'LINEFEED ON COLON (Y/N)?'
816C 03	01500	DEFB	03H ;TERMINATOR
FF20	01510	ORG	0FF20H ;EXECUTION MODULE, 48K
FF20 79	01520 LLIST	LD	A,C ;OUTPUT CHARACTER
FF21 FE0D	01530	CP	0DH ;A <CR>?
FF23 2819	01540	JR	Z,OUTCR ;YES, HANDLE IT
FF25 FE0C	01550	CP	0CH ;TOP OF FORM CODE?
FF27 2815	01560	JR	Z,OUTCR ;SAME AS <CR>
FF29 E5	01570	PUSH	HL ;SAVE POINTER
FF2A FE22	01580	CP	"" ;A QUOTE?
FF2C CC8CFE	01590	CALL	Z,QUOTE ;THEN TOGGLE BYTE
FF2F 2197FF	01600	LD	HL,TEMP ;CHARACTER COUNT BYTE
FF32 34	01610	INC	(HL) ;COUNT ONE MORE
FF33 FE00	01620 CLCPR	CP	0 ;COLON COMPARE OPTION
FF35 2812	01630	JR	Z,CKQTE ;DO IT ON MATCH
FF37 7E	01640	LD	A,(HL) ;GET VALUE
FF38 FE40	01650 MAXLEN	CP	64 ;MAX LINE LENGTH REACHED?
FF3A 2812	01660	JR	Z,CRLF ;YES, SEND A <CR>
FF3C 182B	01670	JR	ENDIT-1 ;NO, OUTPUT CHARACTER
FF3E E5	01680 OUTCR	PUSH	HL ;SAVE POINTER
FF3F 2197FF	01690	LD	HL,TEMP ;CHARACTER COUNT BYTE
FF42 3600	01700	LD	(HL),0 ;RESET COUNT TO ZERO
FF44 CD6AFF	01710	CALL	MODE ;SEE IF PAGINATION ON
FF47 181D	01720	JR	ENDIT-1 ;NOW GO ON
FF49 3E00	01750 CKQTE	LD	A,0 ;GET IT
FF4B B7	01770	OR	A ;CHECK IT
FF4C 20E9	01780	JR	NZ,MAXLEN-1 ;A ONE, NO <CR>
FF4E C5	01790 CRLF	PUSH	BC ;SAVE REGISTERS
FF4F 0E0D	01800	LD	C,0DH ;<CR> CODE
FF51 3601	01810	LD	(HL),1 ;RESET CHAR COUNT TO ONE
FF53 CD0000	01820 DRIVER	CALL	\$-\$;OUTPUT TO PRINTER
FF56 E5	01830	PUSH	HL ;SAVE TEMP LOCATION
FF57 CD6AFF	01840	CALL	MODE ;PAGINATION ON?
FF5A E1	01850	POP	HL ;RESTORE
FF5B 0605	01860 NUMSPC	LD	B,5 ;NUMBER SPACES TO PRINT
FF5D 0E20	01870 LOOP	LD	C,20H ;SPACE ASCII CODE
FF5F CD0000	01880 DRIV2	CALL	\$-\$;PUT TO PRINTER
FF62 34	01890	INC	(HL) ;CHAR COUNTER UP ONE
FF63 10F8	01900	DJNZ	LOOP ;DO TIL DONE
FF65 C1	01910	POP	BC ;RESTORE
FF66 E1	01920	POP	HL ;RESTORE
FF67 C30000	01930 ENDIT	JP	\$-\$;BACK TO PRINTER
FF6A 2198FF	01940 MODE	LD	HL,PMODE ;PAGINATION ON/OFF BYTE
FF6D 7E	01950	LD	A,(HL) ;GET IT
FF6E B7	01960	OR	A ;IS IT ON?
FF6F C8	01970	RET	Z ;NO, GO BACK
FF70 2199FF	01980	LD	HL,COUNT ;YES, POINT TO COUNTER
FF73 34	01990	INC	(HL) ;UP IT ONE
FF74 7E	02000	LD	A,(HL) ;GET VALUE
FF75 FE39	02010	CP	57 ;MAX LINES ALLOWED?
FF77 2801	02020	JR	Z,HOLD ;YES, WAIT FOR PAGE
FF79 C9	02030	RET	;NO, KEEP GOING
FF7A 219AFF	02040 HOLD	LD	HL,MSG4 ;POINT TO WAIT MESSAGE
FF7D CD6744	02050	CALL	4467H ;DISPLAY IT
FF80 CD4900	02060	CALL	0049H ;WAIT TIL <CR>
FF83 CDC901	02070	CALL	01C9H ;CLEAR SCREEN
FF86 2199FF	02080	LD	HL,COUNT ;POINT TO COUNTER
FF89 3600	02090	LD	(HL),0 ;RESET TO ZERO
FF8B C9	02100	RET	;GO BACK NOW
FF8C 214AFF	02110 QUOTE	LD	HL,CKQTE+1 ;GET INDICATOR BYTE
FF8F 7E	02120	LD	A,(HL) ;
FF90 B7	02130	OR	A ;IS IT ZERO?
FF91 2802	02140	JR	Z,ONE ;YES, THEN MAKE ONE
FF93 35	02150	DEC	(HL) ;MAKE A ZERO
FF94 C9	02160	RET	;RETURN
FF95 34	02170 ONE	INC	(HL) ;MAKE A ONE
FF96 C9	02180	RET	;RETURN
FF97 00	02200 TEMP	DEFB	0 ;CHARACTER COUNTER
FF98 00	02210 PMODE	DEFB	0 ;PAGE MODE INDICATOR
FF99 00	02220 COUNT	DEFB	0 ;LINE COUNTER BYTE
FF9A 1A1D	02230 MSG4	DEFW	1D1AH

CHANGE SPACES? 2
 CHANGE LINE LENGTH? 64
 CHANGE LINEFEED ON COLON
 STATUS (1= ON 0=OFF)? 1<

FF9C 43 02240
 FFB7 0D 02250 ZEND
 8000 02260
 00000 TOTAL ERRORS
 27936 TEXT AREA BYTES LEFT

DEFM 'CHANGE PAGE - PRESS <ENTER>'
 DEFB 0DH ;TERMINATOR
 END START ;AUTOSTART AT INIT

Listing 2 — PAGELIST BASIC Program Listing

```

1 IFPEEK(&H4027)<>&HFFANDPEEK(&H4026)<>
  &H20CLS:PRINT@512,"PAGELIST/CMD NOT A
  CTIVE:":PRINT:DELETEL-11
2 CLS:PRINT"PAGELIST PARAMETERS":PRINT$
  TRING$(33,45):IFPEEK(&HFF98)=1PRINT"P
  AGINATION <ON> - LINES PER PAGE = ";P
  EEK(&HFF76):PRINT"LINE COUNTER = ";PE
  EK(&HFF99):ELSEPRINT"PAGINATION <OFF>
  "
3 PRINT"LINEFEED ON COLON ";:IFPEEK(&HF
  F34)<>1THENPRINT"<ON>"ELSEPRINT"<OFF>
  "
4 PRINT"LINE LENGTH = ";PEEK(&HFF39):PR
  INT"SPACES = ";PEEK(&HFF5C):INPUT"CHA
  NGE PARAMETERS (Y/N)";CP$:IFCP$<>"Y"
  THENDELETEL-11
5 CP$="":INPUT"DISCONNECT PAGELIST/CMD
  FROM SYSTEM (Y/N)";CP$:IFCP$="Y"THENP
  OKE&H4026,PEEK(&HFF54):POKE&H4027,PEE
  K(&HFF55):RUN
6 A=PEEK(&HFF98):INPUT"CHANGE PAGINATIO
  N STATUS (1=ON 0=OFF)";A:IFA<2POKE&HF
  F98,A:CP$="N":IFA=1INPUT"RESET LINE C
  OUNTER (Y/N)";CP$:IFLEFT$(CP$,1)="Y"
  ANDRIGHT$(CP$,1)="Y"THENPOKE&HFF99,0EL
  SEPOKE&HFF99,VAL(RIGHT$(CP$,LEN(CP$)-
  1))
7 A=PEEK(&HFF76):INPUT"CHANGE LINES PER
  PAGE";A:IFA>0POKE&HFF76,A
8 A=PEEK(&HFF5C):INPUT"CHANGE SPACES";A
  :IFA>0POKE&HFF5C,A
9 A=PEEK(&HFF39):INPUT"CHANGE LINE LENG
  TH";A:IFA<PEEK(&HFF5C)THEN9ELSEPOKE&H
  FF39,A
10 POKE&HFF34,&H3A:INPUT"CHANGE LINEFEE
  D ON COLON STATUS (1=ON 0=OFF)";A:IFA
  =0POKE&HFF34,1
11 GOTO2
  
```

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Basically BASIC

The lowly PRINT statement

For all models

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PRINT — the most used, least glamorous, yet most versatile statement in BASIC. Not only does it display what we ask, it also calculates before it prints. Let's look at it:

linenumber PRINT *item list*

The *item list* can be text, numbers, variables, expressions, or any combination of these. Here's a simple routine using strings:

```
10 PRINT "This is a string"
20 A$ = "This is also a string"
30 PRINT A$
```

Line 10 prints the text of the string (called a *string literal*) within the quotation marks. Line 20 assigns text to variable A\$ and line 30 prints this text as the contents of variable A\$.

Here's a simple routine using numbers:

```
100 PRINT 123
110 PRINT 1 + 2
120 A=2 : B=3
130 PRINT A + B
140 PRINT (A + B + 4) * B/2
```

Simple, but consider the many things the PRINT statement is doing. In line 100, it prints a number. In line 110, it calculates the value then prints it. In line 130, it obtains the values of the variables, calcu-

lates their total, and then prints it. In line 140, it performs calculations on variables and numbers before printing the result.

A PRINT statement with nothing in its item list (e.g., 15 PRINT) will print a blank line. Add a few PRINT statements to the above routines at lines 15, 35, 105, and 135. With these changes, the text prints on every other line. You can insert PRINT statements into your programs to double-space your lines and make them easier to read.

Print Operators

Once something has been printed, the cursor returns to the beginning of the next line and waits for another PRINT statement. BASIC uses the semicolon and comma punctuation marks (called *operators*) to change this. The semicolon (;) tells the cursor not to move. The next character printed will immediately follow the last.

Positive numbers, or numeric variables, print with leading and trailing spaces. Try this: PRINT "XXX";123;"XXX." Note the spaces before and after the number. Now, print it again with -123 as the number. The trailing space remains,

but a minus sign has been printed in the leading space.

The comma (,) acts like a pre-set tab on a typewriter. The screen has a "print zone" every 16 columns. The comma in a PRINT statement advances the cursor to the next print zone before printing the next item.

Using a trailing comma in a FOR ... NEXT loop to advance the cursor can be tricky. This is especially true if your screen and your printer have a different number of print zones (or if you're changing a program from a computer with a different sized screen).

This program prints properly on a Model I or III (which have four print zones):

```
10 PRINT "Col. 1", "Col. 2", Col. 3",
"Col. 4"
20 FOR X=1 TO 12
30 PRINT X,
40 NEXT X
```

Line 10 prints the headings, "Col. 1", etc. Line 30 then prints three rows of four columns of numbers below the headings.

If you try LPRINTing this on an 80-column printer, or running it on a Model II (which has five print zones on its screen), you'll find it's printing five columns of numbers. There are

several ways to handle this (e.g., counting the times it prints and after it has printed four times including a PRINT statement to bring the cursor to the next line — 35 K=K+1: IF K=4 THEN PRINT : K=0). The point is that if you encounter this kind of situation, you'll have to figure out what the output should look like and revise the program to print properly.

Tab

The comma allows us to print at pre-set tab locations. The TAB function lets us set our own locations. Its form is TAB(*position*).

The *position* number may be any number, variable, or expression with a value from 0 to 255. TRS-80 columns are numbered from zero to the number of screen columns minus 1 (i.e., zero to 31 on the Color Computer, zero to 63 on Models I and III, zero to 79 on Models 2 and 16). If the TAB position is set greater than the number of columns, it will be "modulo" 32, 64, or 80 screen width (i.e., the computer will subtract multiples of the screen width from the indicated position to get to a valid column, then print at that column).

A TAB function may be entered in the PRINT item list wherever needed. It moves the cursor to the tab column and begins printing there. Try this simple program:

```
10 A=5 : B=10
20 PRINT "X"; TAB (A); "Y"; TAB
(A+B) A+B
```

This prints the character "X" at column zero, then at column five it prints the number five, immediately followed (after the trailing space) by the character "Y", and the number 15 prints at column 15. This shows several things being printed from one item list.

The TAB function won't move the cursor backward. If the cursor is past the position specified, TAB will be ignored and whatever is to be printed will be printed at the existing cursor position.

PRINT @

TRS-80 owners are fortunate to have the PRINT @ statement — most microcomputers don't have it. This handy statement allows you to print anywhere you want on the screen. (Note: it's for screen display only, there's no way to LPRINT @.)

Its form is:

linenumber PRINT @ *location*,
item list

There are 1024 print *locations* (64 columns by 16 rows) on Models I and III, 1,920 on Models II and 16, and 512 on the Color Computer. They start at location zero in the upper left and go to number 1,023, 1,919, or 511 at the lower right. Your BASIC manual has a video display map showing the locations and numbers. The PRINT @ statement starts printing at the stated location. The location may be a number, variable, or expression.

Looking up the print location every time a PRINT @ statement is to be used discourages many programmers. Here's a routine to simplify it:

```
10 DIM LN(16)
20 FOR X = 1 TO 16
30 LN(X)=(X-1)*64
40 NEXT X
```

This little routine is written for Model I or III. It sets up array LN with elements 1 to 16 representing lines 1 to 16. It calculates the location number for the first location in each line. Using this, you can use line number (row) and column coordinates by adding the column number (zero to 63) to LN (linenumber) in your PRINT @ statement. For example, to print at line 3, column 10, use PRINT @ LN(3)+10. To change this for the Color Computer, change the 64 in line 30 to 32. For Models II and 16, change the 16 in lines 10 and 20 to 24 and the 64 in line 30 to 80.

It's a good idea to get in the habit of putting a trailing semicolon after every PRINT @ statement. Without one, the line following the line on which you're printing will be blanked out. If a PRINT @ statement without a trailing semicolon is used on the bottom line, a linefeed causes the entire screen display to scroll. Printing in the last location, even with a trailing semicolon, scrolls the screen.

Here's a routine to draw a box around the screen of a Model I or III. Add the following lines to the above routine:

```
5 CLEAR 200 : CLS
100 PRINT@ LN(1), STRING$(64,
131)
110 FOR X=1 TO 15
120 PRINT@ LN(X), CHR$(191);
```

```
130 PRINT@ LN(X)+63, CHR$
(191);
140 NEXT X
150 PRINT@ LN(16), STRING$
(63,131);
200 GOTO 200
```

Note that nothing is printed in the last space on the bottom line. Line 200 makes an endless loop to avoid a READY prompt.

Learning to format screen output requires practice and study of print statements, especially the TAB function and the PRINT @ statement. But, the result in attractive, user-friendly programs is worth the effort. That's BASIC.

Programming Tips

1. The "?" is shorthand for PRINT. Using it saves key-strokes.

2. Positive numbers print with leading and trailing spaces and negative numbers fill the leading space with a minus sign.

3. According to the manual, semicolons may be left out of PRINT statements "in cases where no ambiguity would result." I've found that my computer and I have different ideas of what's ambiguous, so I always put them in.

4. If you have a screen with fewer than 80 columns, you'll probably have to amend LPRINT statements to your lineprinter to accommodate its extra columns.

5. A shifted @ in a PRINT @ statement will generate a syntax error. (This is one of my most common errors. Although I have adjusted to all the other differences from my typewriter keyboard, I just can't seem to type the @ without hitting the shift key.)

6. The PRINT @ statement is for video display only. It can't be used with a printer.

7. PRINT @ is a very useful statement for formatting screen output. Bill Barden's excellent book, *Business Programming Applications* (Radio Shack, \$4.95), shows many uses for it.

Tandy topics

Model 4 questions and answers: Feedback directly from Ft. Worth

Ed Juge, Director Computer Merchandising
1500 One Tandy Center, Ft. Worth, TX 76102

Well, it happened again! A Friday phone call from my editor said I slipped up and didn't get my column in on time. I guess I could blame some of it on travel to NCC, then CES, and we're still working on the catalogs I told you about last month. Then, to top it off, I spent the month of May as "guest host" on CompuServe's Software Author's SIG's QUERY section. Sysop Charlie Bowen assured me it wouldn't take over 15 or 20 minutes per day. Charlie, yer clock needs windin' . . . it was more like 3 hours! But, it was lots of fun, and great feedback for our merchandising group.

Since I'm late, and there were a lot of questions asked that you might find interesting, I might just paraphrase some of those questions (and their answers) here for you. I promise not to use them all. Actually, it would take care of "Topics" for the next three years. And, up front, let me thank all the SASIG members who made it such a successful month.

When will CP/M be ready?

Current schedule (and yes, we're about five months behind our intended timetable) is the end of August for all versions. Since I'm

writing this in June, there's some speculation involved, so it's not a "promise."

It seems Tandy always introduces hardware without any software to go with it, e.g., as in Model 16, Model 4 (Model 4 mode), etc. How come?

There are two strategies in new computer introductions. One is to delay the introduction until you can spring it on the market with lots of software. The other is to put out the hardware as soon as it's solid, so software vendors (and users who intend to write their own) can get started early. The former approach prevents programmers from getting started. The latter seems to best serve both groups, since those who can't use it without software are surely free to wait to purchase until everything is ready.

When will Tandy release technical information on the Model 100?

A technical reference manual is being produced now. Target date for availability is the end of August. In the meantime, product manager Bill Walters made as much information as we had available on CompuServe's public access. Numerous others added information. Incidentally, there is a Model 100 SIG on CompuServe now, too.

How can I use Model 4's extra 64K of memory from BASIC?

You can use it from BASIC by using MEMDISK. MicroSoft does not offer a bank-switching BASIC language. The process is sticky enough to be a bear, even for professional programmers. You can do it with SVC's or USR routines. See the Model 4 technical reference manual for further information. We will sell a number of programs which will take advantage of the other 64K, and you can speed up lots of operations by using MEMDISK.

But, some of my really memory-tight Model III programs won't convert and fit in Model 4 mode.

Right. Your Model III programs will continue to run 100% (all those we tested did) in the Model III mode. TRSDOS 6.n (Model 4 mode) does take up more room, but it also includes COM and allows chaining of routines (with passing of variables) so you can actually create a much longer, or more involved, program than ever before. There will be some modifications required of long Model III programs if you insist on converting them.

Will there be low-cost upgrades for Model III programs to Model 4; Scribes, VisiCalc, Profile, etc.?

Yes and no. Yes on the two we own, Scripts and SuperScripts. It won't be free, but it will be lower cost, maybe half price (not yet determined at this time). No on those programs written by outside authors. They depend on these items for their income and there is a substantial effort involved in the conversions.

I seem to have trouble using MEMDISK in my 64K Model 4. Why?

The manual states (page 119) that you can't use MEMDISK and BASIC at the same time in a 64K Model 4. The MEMDISK drivers compete with BASIC for space in the first 64K.

Why doesn't Tandy put technical information and schematics into the owner's manual instead of in a separate technical reference manual?

The folks on SASIG (and readers of this magazine) are more technically advanced than the majority of our customers — *much* more advanced! We've found that the simpler we can make the documentation that is supplied with the computer, the better off we, and they, are. The mere presence of all that technical data is enough to completely "turn off" an apprehensive novice. And 90% of our buyers don't need, or want, it. It's available separately for those who do. Unfortunately, it's usually a little later, due to the workload in the technical writing group.

Have you ever considered that some people won't buy backup protected disks?

Yep, no doubt. We protected one of our in-house programs. Others were, and will be, protected only at the insistence of the authors. I also like to have copies of most of my programs (sometimes at work and at home). It's my opinion that the author is entitled to the income on his work. If I wanted computers at home and at work, I'd have to buy two. Why should software be any different? Someway, someone is going to solve the protection problem in software in a way that it won't cost the user for more hardware, and where he or she can bury themselves in backups that won't run on any other CPU. Then, software protection will absolutely be a fact of life.

So, that's a sampling of the kind of questions I got. See you next month.

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Com 80

Spelunking the caves of CompuServe

Donald L. Stoner, Mercer Island, WA

Do you remember the first time you "lit off" your Model I? I do. I recall thinking: "You may be READY, but I'm not!" Four years (or is it five) later, I'm an "old time Tandyite." I now "whip up" programs and boot disks with wild abandon.

Even the old-timer experiences the same feelings when he or she decides to go "on-line" with a modem. The telecommunications equivalent of your first CLOAD might be, "Far out! I'm connected. What do I do now?"

Let's take a "guided tour" through one of the nation's largest data bases and look at the sights from a newcomer's point of view. If your Radio Shack salesman was worth his salt, he probably sold you a membership to CompuServe Information Service (CIS) along with your modem. Even if he did not, it's a bargain and you should ask for it.

CIS is one of the most user-friendly information utilities (data base) that exist. Even so, it can still be a mind blower for the newcomer to telecommunications.

One reason for the "teleconfusion" is the enormity of information available. CompuServe is like an infinite number of caves (information), connected together by tunnels (menus). Each tunnel leads to more caves, and so on. Each week, more tunnels and caves are added.

More often than not, the newcomer will explore tunnels and caves that are not really the ones he or she wants. After awhile, one begins to feel like Tom Sawyer and Becky Thatcher without a torch.

CompuServe has all the information you could ever wish for, but they are not very good about telling you how to find it. For example, they recommend that you order a copy of their user guide. Just send a request through FEEDBACK. But, how the heck do you find FEEDBACK? The documentation which accompanies your membership assumes that you will "learn by doing." You certainly will, but it's expensive to explore CompuServe without some sort of cavemap.

Hopefully, in this article, I can provide a few tips for getting around the labyrinth called CompuServe. I've learned (in two years or so) where the best caves and tunnels are located and how to teleport my TRS-80 from

one to another.

The first problem the newcomer faces is the log-in process. There are a couple of different ways to enter CompuServe. They have individual entrances to their caves in each of the major cities. These are called nodes in their communications network. In the smaller cities, you may have to enter the cave (node) of another company to connect to CompuServe. These other companies are called packet networks, such as Telenet or Tymnet. These packet carriers are like long-distance digital networks that carry only computer information. CompuServe will charge you a couple of bucks extra for accessing them via one of these carriers since CIS is charged for the packet service. It still beats calling the nearest CompuServe node by long distance.

Here in Seattle, my cave (or gateway) is direct into CompuServe. To contact them, I dial their number: 634-1713. I hear an answering tone, switch on my modem and presto . . . nothing! To kick them in their electronic fanny, I must send a control C. If I send anything else, the screen responds with indecipherable garbage. I have never figured out why. If it happens, I must hang up the phone and try again. Pity the poor newcomer who didn't bother to read the instructions carefully and sort this out.

In a little city to the south (Tacoma), there is no CompuServe node. The folks in this dialing area must log in through a packet carrier called Tymnet. Doing so results in the same response as for CompuServe . . . nothing. This time, however, you must respond by hitting the A key to the question "terminal identified." Don't say TRS-80 as some have done. Tymnet does not have a sense of humor. Having passed this hurdle, your screen should print the words USER ID. Answer with CIS02 for CompuServe user. You should now be connected.

Helpful hint: When you are ready to buy your CompuServe membership, tell the Radio Shack salesman that the deal is contingent on showing you how to log in. Virtually every store has a computer and modem. The store manager is usually required to know the correct procedure. Take a tablet with you and copy down the steps that are required to connect with CompuServe.

Assuming that you have managed to log-in (either direct or through Tymnet), the next thing you will see is User ID: (follow along with me, using the accompanying listing). You are expected to type in the 70000-series number that was assigned to you when you obtained your membership. As you can see, my number is 71625,1620.

After a short pause, CompuServe will ask you for your password. As you type this in, don't be surprised that you do not see the characters echoed back to you. During the password entry, the echoplexer back in Ohio is turned off. This is so that someone looking over your shoulder cannot learn what your secret number is.

Assuming that you enter the ID and password correctly, the next thing you see will depend on a number of factors. Following the time-date line, information may be sent to you regarding new services, revised phone numbers and so on. This is also the point where you will be advised if electronic mail is waiting for you. Usually, however, you will be transported into the first tunnel: the CompuServe main menu. This is Page CIS-1.

Helpful hint: Note that each screen "page" has a page number. It is located in the upper right corner of your screen and usually consists of three alpha characters and one to three digits. When you find an interesting tunnel or cave, write down the page number. Later, you will be able to use these numbers to teleport yourself around the CompuServe labyrinth.

The main tunnel (page CIS-1) presently has six selections. Each of these leads to more tunnels and caves and they are grouped into general areas of interest. Home services has things like banking, gardening and so on. I've not found too much of interest here that I could not have for the price of a newspaper or magazine. The business and financial section has some interesting information to those who are into stocks, bonds and the like. I'm more concerned about next month's house payment. My favorite is personal computing, and we'll travel to these caves in a moment. Services for professions is for various groups like doctors, lawyers, pilots and so on. Again, not too much of interest for me.

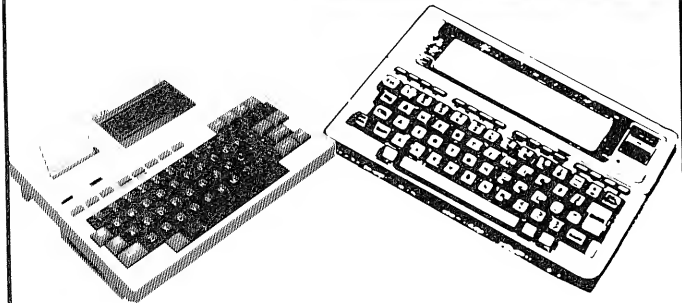
Helpful hint: Before you start exploring, turn on your printer and go to selection 5, called User Information. This is shown in listing as page CIS-4. Select item 2 (Command Summary and Usage Tips). Print out this section completely for later study. Note that you can send electronic mail to CompuServe via the program called FEEDBACK (so there's where it is!). You can also order user guides, manuals and videotex software via menu selection 3. While you have the printer fired up, go to selection 4 and simply hit enter for each of the selections. The enter default will leave your terminal parameters unchanged, but you will have a printout of all those items which can be revised. You can look at the other items later on, if they are of interest.

This time, rather than making a numeric selection, press the M key. This will take you back to the previous menu, which is the main (or TOP) menu. Before you disconnect your printer, select number 6 on the main menu and print out the index of page numbers. This may prove to be your most valuable listing later on. After the listing is done, again type M for the main menu.

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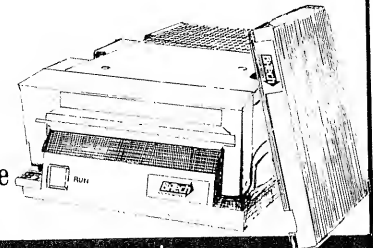


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Next, select number 3, personal computing. This tunnel will be page PCS-1 (see listing). The communications selection takes you into the caves for electronic mail and the public bulletin board. The programmer's area is for the pro's because there are no menus to guide you. We'll duck into this cave later on.

To see why your \$20 CompuServe membership is a bargain, press number 5 to get to the menu for clubs and groups (page PCS-50). This page is a partial listing of the special-interest groups (SIGS) that reside on CompuServe. The granddaddy of all groups (the one which started them all), is called MNET-80 and is run by Richard Taylor (selection 9). The operator of a SIG is called the SYSOP (system operator). Richard is a former opera singer who gave up his career for computers when the TRS-80 Model I was introduced. Today, in addition to his activities on CompuServe, Richard is the president of Programs Unlimited, a franchise hardware/software house that is sweeping the country.

The other SIGS of interest to TRS-80 users are number 7 (for the Color Computer), 10 (for users of LDOS), and 11 which is run by QSD Software.

Helpful hint: Before we visit Richard Taylor's SIG, let me show you a couple of tricks for teleporting around CompuServe. Rather than pressing 9, type the letter T. Presto! You are back to the top menu and you got there without wading back through the previous menus. It works in the other direction too. Rather than go all the way forward through the menus you have already seen, type GO PCS-50 rather than a menu selection. If all goes well, you should see "Request Recorded, One Moment, Please." You can use the GO command from any of the menus so long as you know what page to which you

```
↑C
User ID: 71625,1620
Password:
CompuServe Information Service
22:39 PDT Monday 23-May-83
CompuServe Page CIS-1
```

```
CompuServe Information Service
1 Home Services
2 Business & Financial
3 Personal Computing
4 Services for Professionals
5 User Information
6 Index
```

Enter your selection number,
or H for more information. 5

```
CompuServe Page CIS-4
USER INFORMATION
1 What's New
2 Command Summary & Usage Tips
3 FEEDBACK, Manuals, Products
4 Changing Terminal Defaults
5 Changing Your Password
6 Reviewing Your Charges
7 Changing Credit Card Info
8 Telephone Access Numbers
9 Current Rates
10 CompuServe Viewpoint
11 Electronic Bounce Back
```

Last menu page, key digit
or M for previous menu.

```
CompuServe Page PCS-1
PERSONAL COMPUTING SERVICES
1 News
2 Reference
3 Communications
```

want to teleport.

At this point, you should be in MNET-80 as a visitor. This SIG has a \$20 membership charge. As a non-member, you cannot make your parameters (see below) permanent. You can still read the messages, but you cannot leave a message (other than a membership request), nor will you have access to the enormous data base of TRS-80 programs and utilities. Many of the important people in the business of selling and supporting the TRS-80 are members of MNET-80. This includes Bob Snapp (Snappware) and Lance Micklus (of ST80 fame), to drop a couple of names. Several executives at Tandy are members. Ed Juge and Bill Walters faithfully answer messages directed to them. What other major computer company provides this type of support?

New users of any SIG are first exposed to a simplified menu. Since I am already a member of MNET-80, I have taken the editorial liberty of splicing a newcomer's menu to the MNET-80 check-in. This will save listing space in the magazine. You will not see the "Do you wish . . . Inserting name and ID:" on MNET-80 unless you have sent in your \$20 membership fee. However, the newcomer's menu is representative of the other SIG's, which do not have a membership charge.

You can live with the simplified menu, but I recommend that you enter OP (or number 9) to change your SIG options. When you see the option menu, enter 1 to change to command mode. Then, when you see the User Option prompt, enter LL to change your line length to 64 to match your Model I/III (32 for the Color Computer, or 80 for the Model II, 4, 12 and 16). Finally, enter BR for Brief mode, P to make these options permanent and T to go back to the top menu of the SIG.

Helpful hint: This brings me to a "beef" that seems to bug both newcomers and experienced users of CompuServe. To return to a main section from some menus, you are expected to type EXI for exit. From other menus, the service wants T for top. Be careful that you use the correct return character(s) and only the required number. For example, if you are returning to the main section from the SIG option menu discussed above, you must press T. However, if you accidentally hit T twice, here's what happens. The first T takes you back to the top of the SIG menu like it is supposed to. However, the second T you entered will be held in a buffer at CompuServe and take you back to the top menu (Page CIS-1) even though you did not want to exit the SIG.

I've run off a couple of messages to show what you can expect to see. At the function prompt, I entered RS (retrieve selective). The SIG responds with Search Field and I entered S for subject. The string I searched for is 100. Thus, only messages relative to TRS-80 Model 100 are printed. I've only shown a couple of responses which were among the dozens that had been posted since message 39200. The message from Clay Schneider was entered at 5:45 p.m. It was answered at 8:45 the same day by Jesse Bob Overholt. Note the (X) on the To: line of message 39237. It indicates that Clay read the reply. How would you like to have your TRS-80 questions answered this fast?

Note that at the (C)ontinue, (RE)ply, (T)op prompt, I typed GO PCS-71. I could have entered GO PCS-126.

EPROM PROGRAMMER

\$143

• PROGRAMS

- 2758
- 2716
- 2732
- 2732A
- 2764
- 2516
- 2352
- 2560
- 27128
- ARCADER PER
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4 Shop at Home
5 Groups and Clubs
6 Programmer's Area
Last menu page. Key digit
or M for previous menu. 5

CompuServe Page PCS-50
Personal Computing SIGS
1 CP/M SIG 11 ST-80 Users
2 HUG (Heath) 12 Programmer's
3 MAUG (Apple) 13 CEM SIG
4 MNET-11(H11) 14 Author Forum
5 MUSUS P-sys. 15 Commodore
6 RCA micros 16 Atari SIG
7 TRS80 CQCO 17 IBM PC SIG
8 Panasonic 18 OSI SIG
9 MNET80 TRS80 19 Instructions
10 LDOS TRS80 20 Descriptions
Input a number or key
<ENTER> for more choices 9

CompuServe Page PCS-54
Request Recorded,
One Moment, Please
Thank You for Waiting

Your name: Don Stoner
Do you wish to be added to the
member list at this time? Y

Inserting name and ID;
Please stand by...

Welcome to MNET80, V. 1A(52)

Name: Don Stoner 71625,1620
Last on: 23-May-83 22:09:53
High msg#: 39270

You are user number 127070
System contains messages
38938 to 39282

Function menu:
1 (L) Leave a message
2 (R) Read messages
3 (RN) Read new messages
5 (B) Read bulletins
6 (CO) Online conference
9 (OP) Change your SIG options
0 (E) Exit from this SIG

Enter selection or M for help: OP
User Options menu:

1 Change to command mode
2 (LL) Change line length
3 (T) Return to Function menu
0 (P) Make options Permanent
Enter selection or M for help: 1

User option: LL
New line length: 64
T - return to Function level
ST - stop between messages (*)
NS - don't stop between messages
LL - change line length (64)
BR - set brief mode, which suppresses
repetitious display of options
NB - clear brief mode (*)
CN - change name
DS - set default login Section (0)
P - make options permanent
MEN - use menus instead of command prompts

User option: BR
User option: P
User option: T

Function: RS

Search field: S
Search strings: 100
System contains messages
38938 to 39282
Starting message number
(N implies since last time on): 39200

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Well, not quite, but with the HEXMAN disk management system it feels like your whole disk library is on one big disk!

Here's how it works. Under the Hexman system, a set of "Filestore" disks reside permanently in your disk drives. These disks contain your most active files. Any files that you wish to use, or create or change are kept on these Filestore diskettes. Files that you are not currently using are kept in a "Library" of disks beside your computer. Hexman maintains a catalog of all your files, and which disks they are on. When you need a file that is not currently in the Filestore, give Hexman its name. Hexman will instruct you to insert the appropriate Library disk and transfer the file into the Filestore. Library disks are identified by numbered color-coded labels which we provide.

If you had to mount Library disks every time you needed some files, Hexman would be no better than the old way of doing things. But here comes the clever part. Hexman knows which files are in the Filestore, so it only loads files if they are not currently available in the Filestore. It counts how frequently you use each file, and ensures that the files in the Filestore are the ones that are used most frequently. If the Filestore disks are getting too full, Hexman removes the least frequently used files. Because the most active files are kept in the Filestore, the chances are that any file you need will be ready and waiting. Only when you request a

rarely used file does Hexman need to move it in from the Library. Thus as Hexman becomes familiar with your pattern of file usage, transfers from the Library drop to a minimum.

Each morning, when you first use Hexman, it scans your Filestore, notes any changes and takes action. Any new files are automatically cataloged. New and updated files are backed up to the Library. Hexman makes this easy to do by sorting the files into Library disk sequence, then prompting you to insert the appropriate Library disks one after the other. This Filestore scan and backup process ensures that your disk Library files match the active files in your Filestore. Thus you can safely treat the few Filestore disks in your drives as if they contained your whole disk Library.

Besides the basic Storage Management Module described above, additional modules are available for those that need the extra power. The Security module creates two additional copies of any vital files, and allows off-site storage of one of those copies. The KeySearch module allows the cataloging and retrieval of files by keywords (also called headings or categories). This module allows fast retrieval of files even when you can't remember their names. Other extension modules for the Hexman system are planned.

Requirements.

TRS-80 Model III—48K, 2 drives.
Model I—48K, 2 drives
Double Density adapter
Lower case modification.
Operating Systems
LDOS 5.1 Newdos 80 Vers 2
DOSPLUS 3.5 (Available shortly)

HEXMAN D.M.S. Vers 2 US\$79.95
(Storage Management Module)

Security Module \$39.95
KeySearch Module \$49.95

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This would have taken me directly to the Color Computer SIG. You can explore this group, if you are interested in the Color Computer. There is no membership charge. If you are interested in any of the other SIGS, you should have their page numbers if you printed the index as suggested earlier. By the way, those of you who have Orchestra 80/85/90 capabilities will be interested in a well-hidden data base with a lot of music software. Simply type GO HOM-13 at any of the menu prompts for the data base or GO ORC for the Orchestra 90 archives.

If you are a ham radio operator, you must check out another hidden cave called HAMNET. It's not listed on the menus, but can be entered by typing GO HOM-11. The SYSOP is Scott Loftiness, W3VS. The latest ham technologies are discussed and many prominent radio amateurs check into this database.

Now that you have a rough idea of how the tunnels and caves are connected, let's make a foray into the very heart of CompuServe. Let's actually do some programming on their DEC computers. I've forgotten where I left you, but from one of the menu prompts, type GO PCS-71. This will take you to the same place in the system as if you had made selection 6 (Programmer's Area) on page PCS-1. If you make the transition successfully, your screen should print OK. This is the prompt for the programmer's area. Type DIR (for directory). Since you have no stored files at this point, you will get a message to this effect. However, you have 120K bytes of storage available, so let's use some of it.

Type FILGE TEST. This is the file generator program and you are going to create a file called TEST. After the message telling you the file has been created, whatever you type will go in this file until you close it. Type "The Quick Brown Fox" and/or "Now is the time," etc. In fact, type anything you like. By the way, don't type more than 80 characters or so before hitting the enter key. When you tire of the game, hit enter, then type /EX (for exit). The OK prompt will return. Now, type DIR. Holy smokes, there's a file named TEST that is 3200 bytes long, created on such and such a date with a protection code of (4). Note that CompuServe saves the files in 3200-byte blocks. No matter how much text you entered (up to 3.2K), you will consume 3.2K of your allocated space.

At the time this article was written, I had four files in my directory. This is electronic mail that I have saved in my filespace, awaiting time for me to reply.

By the way, if you wanted to upload a file to CompuServe, the procedure would have been the same. Type FILGE and a filename. Then start transmitting your file. The echoes you receive from CompuServe will make you think they are getting garbage, but keep sending. After the file has been transmitted, type /EX to close, as before.

To look at your file, type TYP TEST and you will see the characters exactly as you entered or uploaded them earlier. If you want to scrub the file, type DELETE TEST. You should practice using the file generator (FILGE). However, for correcting errors and deleting or inserting text, you will need CompuServe's guide. FILGE is probably unlike any text editor you have ever used. All commands are preceded by a slant bar (/). However, you will need to get familiar with FILGE as

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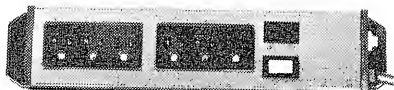
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Com 80

#: 39212 Sec. 4 - Model 100
Sb: #Mod 100 question
22-May-83 17:45:08
Fm: Clay Schneider 70240,212
To: All

In looking through the ROM, I noticed the following 3 prompts (?)
Top:, End:, and Exe: (if I remember correctly). Can someone tell me who or what these belong to? Thanks, Clay
* Reply:

39237
(C RE T): RR

#: 39237 Sec. 4 - Model 100
Sb: #39212-#Mod 100 question
22-May-83 20:54:22
Fm: Jesse Rob Overholt 70130,101
To: Clay Schneider 70240,212 (X)

Clay, The Top,End,Exe labels are displayed by BASIC when a .CO file is LOADED from the direct (i.e. not in a program) mode. They refer to the start, end, and execution addresses of the machine language program.

* Reply:

39270
* RR 39212 +
(C RE T): GO PCS-71
Exiting at 23-May-83 22:45:03
Last message on system: 39282
High message retrieved: 39270
Thank you for visiting MNET80

Compuserve Page PCS-71

Request Recorded,
One Moment, Please
Thank You for Waiting

OK

dir
DAD 3200 21-May-83 (4)
SCOTT 3200 19-May-83 (4)
REPLY.TXT 3200 01-May-83 (4)
TERRY 3200 01-May-83 (4)

Total chars 12800 in 4 files

OK

R ACCESS
Access
Public File Access System
Use ? for help

Access: CAT[70130,101]
Access

70130,101
DISASM.100 29-Apr-83 1695 Accesses: 58 23-May
DISDOC.100 29-Apr-83 2580 Accesses: 56 23-May
LIBDOC.100 21-May-83 3860 Accesses: 22 23-May
NOTES.100 06-May-83 785 Accesses: 86 23-May
OPCODE.100 29-Apr-83 2160 Accesses: 54 23-May
RFU.100 22-May-83 7605
SUBLDR.100 21-May-83 2915 Accesses: 22 23-May

Valid commands:

CAT - catalog
COP - copy to disk
TYP - type a file
DOW - download a file
KEY - search keyword list
SUB - submit a file
DEL - delete a file
EXI - exit from ACCESS
HEL - explains ACCESS

Access: EXI
Thank you for using ACCESS!

OK

OFF

Off at 23:29 PDT 23-May-83
Connect time = 0:26

this is the principal method of creating the text for electronic mail and public access, bulletin boards, etc.

Helpful hint: If at any time you seem to get stuck inside one of the CompuServe disks, simply type control C. You will abandon whatever you were doing, but it should return you to the OK prompt. If you want to get back to the main menu (page CIS-1), simply type R DISPLA from the programmer's area.

Okay, ready for the good stuff? Want to see where all the programs are stored? Better check the credit limit on your MasterCard, 'cause you could run up a bill with this one! Type R ACCESS. At this point, I suggest you fire up the printer again and hit the question mark for help. Print out the commands and syntax required for the public access program.

For starters, when you see the Access: prompt, type CAT right square bracket, 70130,101 left square bracket and enter just as I have done on the sample printout. This will take you to the catalog of programs stored by Jesse Bob Overholt, one of the many genius programmers who can be found on CompuServe. The listing shows his programs for the TRS-80, Model 100, stored as of 23 May, about the time this was written.

If you would like to download one of these programs, type TYP NOTES.100 (for example), then Jesse Bob's identification number inside of the square brackets. Before you hit the enter key, open your smart terminal program buffer. As soon as you hit the enter key, the program will come tumbling across your screen. As soon as you see the Access: prompt or "Press enter for next page," close your terminal program buffer and save it on a disk. You will need Scripsit to edit out the garbage at the beginning and end of the downloaded material.

If you would like to search for other programs, type CAT/KEY: followed by suitable key words like TRS-80, COCO, MC10, or Model II. You might turn on your printer because there will be dozens (in some cases hundreds, as with a keyword like TRS-80) of program titles. The downloading procedure for any of these programs is the same, although some may need ASCII to binary (machine language) conversion.

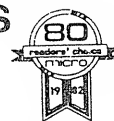
By the way, the DOW selection for downloading assumes you have one of CompuServe's downloader programs or a terminal program with automatic buffer open (control R) and close (control T). If you do not, use the TYP command.

When you cannot afford any more downloading, you can exit the public access program by typing ESI. This will take you back to the OK prompt. From this point, or virtually any other point in the CompuServe tunnels and caves, you can type the word OFF and be disconnected. If you still have a few bucks to spend, you may wish to type R CB. This will take you to the intercommunications program between you and other users of CompuServe. I've found it is usually a bunch of chaotic nonsense (much like the real CB service), but you may enjoy being able to keyboard with someone clear across the country, in Canada, and occasionally from Europe.

I've got to type OFF now, before the editor pulls my plug on what started out as a relatively short column. Until next month, have fun with your modem and new CompuServe membership.

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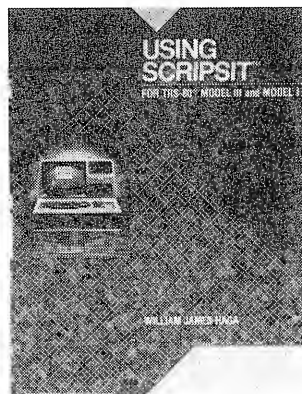
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Lobo MAX 80

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Harry Avant, La Crescenta, CA

In the introduction to the 360-page preliminary MAX-80 operation manual, Lobo Systems describes their MAX-80 as follows, "The MAX-80 small business computer has exceptional expansion capabilities." This is the best understatement I have ever seen in an operation manual. Incorporated in a housing about three inches deeper and perhaps an inch higher than a TRS-80 Model I keyboard, Lobo has managed to fit in controllers for both five- and eight-inch drives, two serial ports, a parallel printer port, hard disk port, expansion bus and a video port. In addition to all of the expandability, the unit also has a real time clock, speaker and up to 128 kilobytes of random access memory (RAM).

For this evaluation, Lobo supplied the following items:

Item	Price
MAX-80 with 128K RAM and CP/M	\$ 945.00
LDOS operating system ..	\$ 69.00
Dual 8-inch drives	\$1185.00
Dual 5¼-inch drives	\$ 690.00
Amdek video monitor (green)	\$ 175.00
(Amber monitor price \$195)	
Total list price	\$3064.00

This configuration probably includes more drives than most buyers would choose, but it did allow for evaluating both operating systems on both size drives.

Two operating systems are available for the MAX-80. A disk operating system is necessary with the MAX-80, as it is a totally RAM-based computer except for the boot ROM. For TRSDOS compatibility, LDOS 5.1.3 is supplied. This is very similar to LDOS as supplied for the TRS-80 Model III, but is modified for the Lobo unit. CP/M 2.2 is also available for the MAX-80. The MAX-

80 runs either system with no hardware modifications. It uses whichever operating system is put into the first drive and booted.

When first unpacked, I noted that in addition to all of the I/O capability, the power supply was also inside the unit. Placing so much into such a small package always makes me worry about heating problems. I powered up the unit for a couple of hours while reading the operation manual. After two hours, the rear of the keyboard was slightly warm. Twelve hours later, the keyboard was still only slightly warm. Following hours of continuous use, the

In addition to being a superb TRSDOS-type computer, the MAX-80 shines as a CP/M system. A little more than 56K is currently available for program use.

MAX-80 showed no ill effects due to heat.

The keyboard has 76 keys, four of which are function keys. A numeric keypad with an enter key is placed next to the function keys. The layout of the keyboard is different from a TRS-80 Model I or III. The return key is placed on the same row as the letter P key. A rightarrow key is located where one used to a Radio Shack computer would expect to find the enter key. This layout seems to have been done to place the arrow keys in a diamond shape with a clear key in the diamond center. I found that it took a few days to get used to the Lobo layout. An escape and

control key, both of which are necessary for CP/M use, are located on the left side exactly where they should be. Although the keyboard has excellent feel and no bounce, I think it could be improved by adding a slight depression to the F and J keys for locating the home position. The design of the unit provides an excellent palm rest.

All interfaces are brought out to the keyboard back panel. Standard edge connectors are used for the drives and parallel printer, and they are gold plated. Two standard RS-232C connectors for serial ports, reset button, time set, video output and a boot drive select switch are also on the rear. In spite of so many connectors to hook up, the unit is very simple due to the silk screened labels at each connector and excellent documentation.

An I/O bus connector is also provided, with all of the data lines and the lower address lines a la TRS-80 Model III. The bus is very well documented in the manual. One item that is missing is a cassette interface. This is strictly a disk-based system. The cassette I/O will be missed by people who have used it for sound generation.

A nice touch in conjunction with the parallel printer port is a tiny switch just inside the edge connector to defeat the automatic linefeed after carriage return some printers produce. A mini dip switch is also accessible from the rear that selects the type of drive for the Lobo to boot up on. You can choose 5- or 8-inch floppy or hard disk.

A small, removable, panel on the bottom allows access to the batteries, if required. These are used to keep the real time clock running when the Lobo is turned off. During power-on, the batteries are

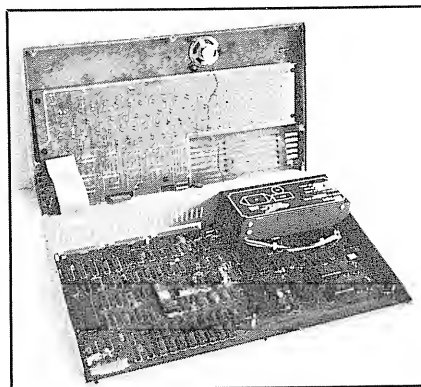
automatically recharged. This panel also allows access to jumpers for specialized configurations. Except to add memory (in case you forgot to order a Lobo with the full 128K), there is no reason to open up the computer. My excuse was that I wanted to see the inside! If you do open one up, please read the section in the manual that describes how to do it. It would be easy to break the small speaker wires.

Inside is a custom linear power supply and two boards. The upper one holds the keyboard and the heart of the computer is on the lower board. All the major integrated circuits are in sockets. The boards are very well laid out, well labeled, and have no jumpers. The Lobo design is just that, a design, and not an afterthought. Those of you familiar with the Lobo expansion interface that was made for the TRS-80 Model I will be happy to know that Lobo builds computers with the same approach; clean layout and heavy-duty construction.

An Amdek Model 300 video

monitor is supplied with the Lobo. I would not recommend buying a monitor with any less bandwidth than the Amdek, as the 80-character by 24-line mode with CP/M does

MAX-80 interior circuitry



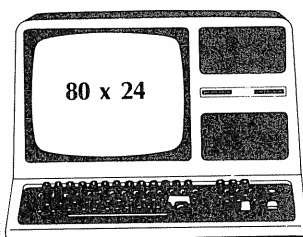
require a monitor this good for comfortable viewing. The video output is controlled by a Hitachi CRT Controller (CRTC) chip. The complete data sheet for the CRTC, all 50 pages, is included in the manual. This is a very good

controller and its use gives the Lobo some really fast video scrolling.

Lobo's speed is primarily a function of the computer's clock, which is running at 5 megaHertz. There is just no comparison in speed to a Model III running at 2 megaHertz. As of this writing, the Lobo is probably the fastest Z-80-equipped microcomputer generally available. There is no way to slow the clock down, which means that video games written for a TRS-80 will be far too fast on the Lobo.

Documentation supplied with the computer is very complete. The manual is a preliminary version dated October, 1982. This manual has a lot of ground to cover because it discusses set-up options and all of the MAX-80 technical areas. It also supplies a few touches of light humor here and there which help when the going gets tough. I did find a few minor problems with the description of generating a different sized bootable CP/M disk. The information is there, but it is tricky to follow the first time. It was only

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through trial and error that I found the caps-lock key for CP/M to be the F1 key. Complete guidelines for hooking up non-Lobo drives are supplied. A very thorough discussion of set-ups for a variety of drive configurations is presented. The MAX-80 will work with almost any combination of 5-inch drives, single- or double-sided.

In addition to the Lobo manual, the LDOS operating system comes with its own documentation. This is the standard LDOS zillion-page manual. In the front of the LDOS manual are a few pages of MAX-80 additions. Although this is a special version of LDOS for the MAX-80, the message regarding the real-time clock (no longer accurate) still appears after a format or backup. This should be corrected, as the real-time clock in the MAX-80 is just that, a real-time clock, and will remain accurate before, during and after backups and format utilities are executed. If you are an LDOS user and happy with LDOS, you will love it on this computer. All of the extensive bells and whistles that LDOS is noted for are there — they just run much faster.

If you are not familiar with LDOS, you will find that it is a very

powerful TRSDOS-type disk operating system. Some Radio Shack software may require patching to run with LDOS. Logical Systems, Inc., creators of LDOS, provide simple-to-use patches where required. Lobo's ad states that LDOS will allow you to run standard Radio Shack software. In general, this is true, but don't expect to see the special character set used by the Model III. In its current form, LDOS for the MAX-80 does not generate these characters. Also, as noted above, most games written for the Radio Shack computers will be impossible with the MAX-80 because of the 5 megaHertz clock.

If you don't like LDOS, expect to see DOSPLUS available for Lobo's powerhouse before the end of the year. At least that was the answer I received from the good people in Florida in response to my phone inquiry. I tried a similar call to the NEWDOS folks in Denver, but they stated that they did not expect to produce a MAX-80 version.

In addition to being a superb TRSDOS-type computer, the MAX-80 shines as a CP/M system. A little more than 56K is currently available for program use. This is enough to run all major CP/M programs. The

version of CP/M supplied is 2.2, but Lobo will introduce a version of 3.0 (CP/M Plus) for 128K versions soon. This will be a welcome addition, as it will allow the system to take full advantage of the extra 64K RAM.

Lobo has devised a slick use for the extra 64K of RAM under version 2.2. This section of memory can be configured as a memory-based disk, with a 1K directory and 63K free space. The overlays for WordStar fit right in and allow you to have instant help messages. If you are used to WordStar on a conventional system, even one with a hard disk, you will find the speed awesome.

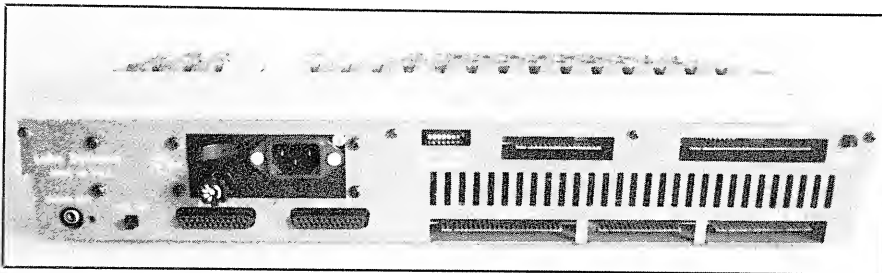
A redefinable character set is available with the CP/M operating system. It requires modifying a supplied character set source code and reassembling it. This could be a lot easier with a menu-driven program. Utilities such as this allow you to draw the characters on the screen in an enlarged format and save them back as files.

The keyboard is remappable under CP/M, which allows you to redefine any key to any character. Notable exceptions are the four function keys which cannot be redefined under this release of CP/M. I hope Lobo implements this as soon as possible. It would be very nice to be able to define function keys for use with WordStar and other programs that use a lot of control sequences for cursor control.

Terminal control codes are fully documented for the Lobo. Although no inverse video is generated, a half-intensity mode is available. In addition to cursor position codes, the video also provides for "erase to end of line" and "erase to end of screen." The erase to end of line is not implemented by some of the CP/M computers I have used, and if absent, can preclude running some of the popular business packages.

Another nice feature of this CP/M is its ability to copy files written on other formats, including the Omikron, Xerox and Osborne single density. Lobo has addressed the problem of lack of standards among 5¼-inch disks using CP/M. This pretty well insures that you will be able to get any CP/M program in a format that can be read into a MAX-80.

Rear view of Lobo's keyboard



New MAX-80 keyboard



All is not perfect with this preliminary version of CP/M. I noted before that the function keys cannot be programmed. When I tried the system using a 40-track single-sided drive on A and two 5¼-inch 77-track drives as B and C, the poor MAX got a little confused. During a warm boot from one of the 77-track drives, quite a bit of time was used with the system trying to remember what types of drives were in use. XCONFIG.COM, the program that is supposed to handle this, needs a little more refining.

During the month I had the Lobo for testing, it worked hard and well. This equipment is designed for continuous use. The Lobo drives, especially the 5¼-inch, are a bit more expensive than some other makes, but are probably well worth the few extra dollars. The drive housings are big and rugged, and include cooling fans. Lobo just doesn't believe in flimsy equipment. Another point to consider regarding the Lobo drives is that they, like the

computer, carry a one-year warranty.

The real-time clock is nice for automatic date stamping of files with LDOS and will be a feature of CP/M 3.0, when it is released. The clock is also a nice feature of Maxcomm, a terminal program I tested on the MAX-80. This terminal program gives you a message showing how long you have been logged onto a remote computer system such as The Source or CompuServe.

Both operating systems performed without any significant problems. LDOS has been bug free for a long time and can run circles around TRSDOS. The Lobo CP/M is referred to as a preliminary version, but it is a lot better than many versions I have tested on computers costing much more than the MAX-80.

Lobo supports the hardware and software they make with good documentation and very patient people over the phone. In addition, a user's

group called "MAXIMUL," located in Florida, seems to be very active.

For more information, contact Lobo Systems, 358 South Fairview Ave., Goleta, CA 93117, (805) 683-1576.

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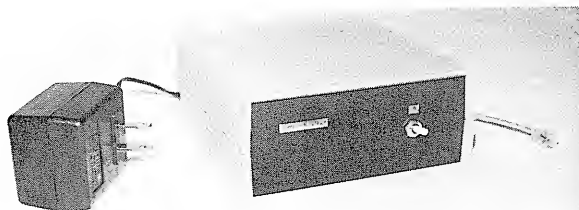
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In the chips

Entering the source code

Models I/III

Spencer Hall, Associate editor

KEYFIL, the short and simple bit of source code which accompanies this article, contains so much that needs explanation that I'm at a loss where to begin. Perhaps I should start by telling you that once upon a time, there was a reader of *Basic Computing* who saw some source code, typed it in under BASIC and entered RUN.

Please don't laugh. If you stop to think a moment, you'll realize that it's a perfectly logical mistake if one is new to computing. The angry letter he wrote to the editor was both eloquent and scholarly. Let me tell you now what we told him.

Source code is a series of messages, not to the computer, but to the editor/assembler program. We want some machine language code which will do certain things. We want it to contain certain messages and we want to put it at a certain place in memory. As we found out last month, writing this code and putting it where we want it is very tedious business. That's why we buy ourselves a version of EDTASM. You'll need one of these versions to follow the rest of this article. Boot it up now and we'll talk.

Every line you write with EDTASM must have a linenumber. These numbers come automatically, just as they do in BASIC when the AUTO command is invoked. To start them, simply respond to the prompt, which is an asterisk (*), by entering a capital I. The first linenumber will default to 100, written

```
00100      ORG      32000
00110 ;-- SUBROUTINE TO PRINT TEXT ON THE SCREEN --
00120 PRINT  LD      A,(HL)      ;GET A BYTE FROM TEXT
00130      OR      A            ;TEST: IS IT 0?
00140      RET      Z           ;IF SO, BACK TO CALLER
00150      LD      (DE),A       ;ELSE SEND TO CRT
00160      INC     HL           ;NEXT CHR. IN TEXT
00170      INC     DE           ;NEXT SCREEN POSITION
00180      JR      PRINT       ;REPEAT THIS ROUTINE
00190 ; -- SUBROUTINE TO FILL SCREEN USING LDIR --
00200 FILSCN LD      HL,3C00H    ;GET BYTE FROM HERE
00210      LD      DE,3C01H    ;AND PUT IT HERE
00220      LD      (HL),A      ;"PLANT" CHR. IN 1ST POS.
00230      LD      BC,03FFH    ;PUT 1023 IN COUNTER (BC)
00240      LDIR              ;FILL 1023 ADDRESSES!
00250      RET
00260 ;      -- PROGRAM STARTS HERE --
00270 BEGIN  CALL    01C9H      ;ROM ROUTINE FOR CLS
00280      LD      HL,TITLE     ;TEXT TO PRINT
00290      LD      DE,3CDDH     ;PUT IT HERE
00300      CALL    PRINT       ;DO IT!
00310      LD      HL,ANYKEY    ;TEXT TO PRINT
00320      LD      DE,3D9EH     ;PUT IT HERE
00330      CALL    PRINT       ;DO IT!
00340      LD      HL,USEBRK    ;TEXT TO PRINT
00350      LD      DE,3E17H     ;PUT IT HERE
00360      CALL    PRINT       ;DO IT!
00370 GETKEY CALL    0049H      ;ROM CALL - GET KEYSTROKE
00380 ; (ROM 0049H WAITS FOR KEYSTROKE - PUTS IT IN REG. A)
00390      CP      01H         ;WAS IT BREAK KEY (1)?
00400      JP      Z,05CCH      ;IF SO - BACK TO BASIC
00410      CALL    FILSCN      ;FILL SCREEN WITH IT
00420      JR      GETKEY      ;WAIT FOR ANOTHER STROKE
00430 ; -- ASCII BYTES FOR TEXT GO AT END OF PROGRAM --
00440 TITLE  DEFB    'KEYFIL'
00450      DEFB    0
00460 ANYKEY  DEFB    'ANY KEY FILLS SCREEN'
00470      DEFB    0
00480 USEBRK  DEFB    'USE <BREAK> TO EXIT'
00490      DEFB    0
00500      END      BEGIN      ;ADDRESS TO START PROGRAM
```

00100, and each new line will have an increment of 10. You can select your own linenumber and your own increment by entering them after the I, thus: I10,5. This starts you at

line 10 and increments lines by five each. You can't just insert a line between two others as in BASIC. You must ask for it with the I command.

Remarks, titles, or what have you, which are not to be assembled, can be written just about anywhere. Simply precede them with a semicolon. We've used this feature quite a bit in the source code for KEYFIL.

Following the linenumber, there are three "business" columns which EDTASM reads to find out what you want done. The first is the label column. In most cases, you will leave it blank. Simply tab over it using the right arrow key. We'll talk about labels in a moment. Next comes the operator, action or verb column. Here there must be a standard Z80 symbol for one of the operations which the Z80 can perform. After entering it, tab with the right arrow once more and you are in the third (or operand) column. Register names and numbers go here in strict patterns called for by assembly language. It's a good idea to hit the right arrow twice to get over to the next column, because the operand column can sometimes be quite long. This last column is for you to use as you see fit. Don't forget to start it with a semicolon so EDTASM won't try to compile it. use it to describe the purpose of the code you have just written. Unlike BASIC, source code doesn't reveal its purpose easily. Good remarks are a must so that you'll know tomorrow what you were trying to do today.

So, there you have two kinds of

lines written with EDTASM. One is the remark line, beginning with a semicolon, like line 190 in KEYFIL. The other is the regular operation line with its optional first column and mandatory second and third columns. The operation line, assuming you have written it correctly, will cause EDTASM to generate a Z80 instruction of from one to four bytes when you ask for an

Most programmers use hex numbers, not because they are intellectual snobs, but because there are several good reasons for doing so.

assembly. There is one more very important kind of line you can write with EDTASM. It's called a pseudo-op.

To understand what is meant by pseudo-op, you must remember that source code is not a message to your computer. It's a message to the EDTASM program. There are a number of pseudo-ops. Their purpose is to give EDTASM some important instructions you want it

to follow when it assembles your source code into machine language. EDTASM does not translate pseudo-ops into machine language. It simply obeys the instructions they contain.

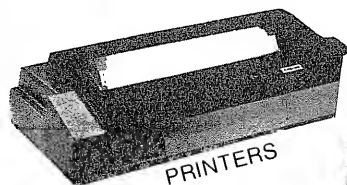
The command, or operator, in a pseudo-op is always written in the second (operator) column. First, and foremost, of the pseudo-ops is ORG. This is the message which tells EDTASM where in memory you want your machine language to reside. Please note that we said reside. We did not say, or even imply, that program execution must start at this location. That message to EDTASM will come later.

In our sample, we want the code to reside (start) at address 32000 decimal. Note that EDTASM understands decimal numbers. In fact, you must add a capital H to identify a hex number. Most programmers use hex numbers, not because they are intellectual snobs, but because there are several good reasons for doing so. One of the most obvious of these reasons is that there are often times when it is necessary to break up a number into its LSB and MSB. This can be done instantly with a hex number.

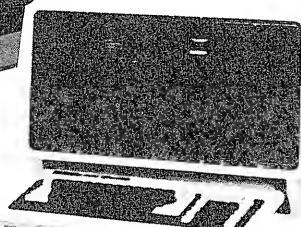
There are three other kinds of pseudo-ops in our sample. Lines 440, 460 and 480 use DEFM. This tells EDTASM that the ASCII bytes for the text between apostrophes must be placed right here. In the case of

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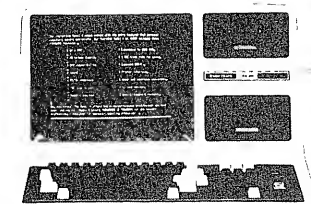
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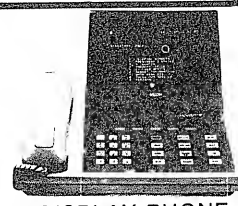


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the word KEYFIL in line 440, "right here" means the RAM addresses immediately following the object code for JR GETKEY. Lines 450, 470 and 490 use DEFB. This means that the byte right there must have a value of zero. This could have been any value up to FFH, which we might have chosen to place in the operand column.

The last pseudo-op in our sample is the word END. There must be an END after any code you want to assemble. Without this word at the end of your source code, EDTASM will send you an error message. There doesn't have to be anything at all in the operand column. Putting something in the operand column has a totally illogical, but very important, effect.

You will note that our sample has the word BEGIN in the operand column. This is a repetition of the word in the first, or label, column of line 270. Words in the label column have just one meaning. They stand for the RAM address where the bytes called for in that line will begin. The operand of the END pseudo-op tells EDTASM that execution of this little program must begin with the code generated by line 270. The code at 32000 decimal, which we have identified by the label PRINT, is only a subroutine. It will be called by name when it is needed.

I hope the incredible power and ingenuity of the editor/assembler is beginning to sink in. In addition to remembering all the 700-plus instructions which the Z80 is capable of executing, it notes the starting location specified in hex or decimal notation by ORG and counts out the exact RAM address relative to this starting point which corresponds to every label the programmer puts in column one. Whenever you see a label used in column three (operand), remember that it is just a RAM address to be calculated by EDTASM.

There isn't room in this issue to explain the numerous other machine language matters illustrated by KEYFIL, so why don't you just type it in and assemble it? To get that independent creative feeling you may want to change the label in line 270 to HERE, or RUN, or any other word (six letters or less) that comes to mind. If the first character

is a letter, numbers will work. How about C3P0? Just be sure to use the same word as the operand in line 500. You can also have fun by changing the text in lines 440, 460 and 480. The hex numbers in lines 290, 320, and 350 are the respective screen starting points for the three strings. You may want to fool around with these, too.

To assemble KEYFIL, respond to the prompt (*) with the letter A, leave a blank and write the filename, KEYFIL. Press enter and you'll see the whole program compiled on the screen. You may want to use another filename such as JUNK. You can't use GARBAGE because filenames can only be six letters long.

Speaking of garbage, it might be a good idea to type a slash after the filename, followed by the letters WE. This so-called "switch" tells EDTASM that you want it to stop (WAIT) when it finds an error. You'll probably have some. If you do, answer the prompt with E, followed by the number of the defective line. You'll be in an edit mode which is virtually identical with the Level II BASIC editor.

When EDTASM goes all the way and reports 00000 ERRORS, you'll get a prompt to ready your tape or disk. You can now create a SYSTEM file which, when executed in the usual way, fills the screen with any character you touch on the keyboard. (What did you expect? VisiCalc?)

There's a lot more to be said about this simple little routine. It will have to wait for next time, but you don't have to. Study the code. Study your EDTASM manual. Study also Mr. Rodney Zaks's excellent book called *How to Program the Z80* (available from Radio Shack). Best of all, find yourself the source code for a program you would like to have. Typing it in is the best possible way to enhance your understanding of Z80 language. The seven installments of *In the Chips* have taught you enough so that these activities will have real meaning. Your understanding of machine language will now grow by leaps and bounds. From here on, *In the Chips* will try to identify some of the mysteries you will encounter in your own explorations and clarify them. Happy programming!

Reviews

Galactic Attack Color Computer Radio Shack Stores and Dealers \$29.95

Radio Shack has just released a new arcade game for their Color Computer. Galactic Attack is a ROM pack game that may be used with any Color Computer with joysticks, and is priced at \$29.95 in their stores.

The theme is a familiar one; you defend your territory from the unending assault of alien spacecraft. The aliens here have ships that are modeled after Darth Vader's fighters and seem just a bit better equipped to deal destruction than were Darth's. They attack in groups of eight ships at a time but are not restricted to remaining in formation. Any ship, or even more than one, may break out of formation and attack you with dive bombing attacks.

If you are skilled enough to destroy all eight aliens in one group, before any of them can fly off of the bottom of the screen, the next attack will be a "night attack." If you are then able to destroy the first wave of night attackers before any get by, you get four times the points during the next attack. If one gets by, the next attack will be a "daylight attack" and points return to normal.

The graphics are good and the action is fast in this game. The aliens jump around enough to make this more than just a target shoot. There is a built-in skill factor that makes each wave of attackers a little quicker than the last so that you have to try a bit harder.

The left joystick is used to control the position of your laser base. The joystick is very fast acting in the game — almost to the point of being touchy. This adds to the skill requirements of the game. You must learn to control that joystick, or you will go sliding all over the screen, colliding with alien ships.

I found the game to be a challenge and consider it to be worth the \$29.95 that I paid for it. The only complaint I have is the quick response of the joystick, but that is because it makes me feel like such a klutz. The sound effects could have been done better than they were, but they are acceptable.

J. L. Latham

The Basic Answer Model I/III Logical Systems, Inc. P.O. Box 23956 Milwaukee, WI 53223 (414) 355-5454 \$69 + s/h

The Basic Answer is the answer to many problems faced by programmers using BASIC. But, just what are the questions it's supposed to answer? First, consider that linenumbers are required in a BASIC program. How many times have you wished you could GOTO or GOSUB to a named routine, like: GOSUB @GETINPUT? The Basic Answer allows this by removing all constraints imposed by linenumbers. They aren't used at all unless the editor you're using is BASIC itself. How would you like to use long variable names that mean something like: INDEXNUM%, or CUSTOMER\$? Well, you can with The Basic Answer, TBA for short, from Logical Systems, Inc., the distributors of LDOS.

TBA is not really a compiler, although what it does is closely related to compiling. It's really a translator. It translates code written in structured, easy-to-read (and debug) BASIC into a Level II or Disk BASIC-runable program. The source code for TBA is intended to be written with LED (also from Galactic), or with Scripsit modified with the LSCRIPT/FIX provided with LDOS, but the regular Disk BASIC editor may also be used. In fact, any editor that writes an ASCII file will create the source code for TBA. This

means that all the global search and replace functions as well as the other powers of your word processor are at your disposal when programming.

The manual states that Superscript may be used as well, but I think that it would be cumbersome converting the file back and forth between Scripsit and ASCII, as would be necessary with Radio Shack's newest word processor. The object code produced by TBA is a complete, ready-to-run BASIC program.

Labels are used in place of linenumbers. A label will be any fourteen-character string which begins with an @ sign, followed by an alphabetic character, optionally followed by up to twelve other alphanumeric characters including the underline and period characters. In order to be declared, a label must begin a line. Subroutines are preceded by the label for that subroutine. When the label is referenced, it may appear anywhere in a line as though it were a BASIC line-number. The @ sign tells TBA that it is working with a label. TBA stores these labels internally during processing and converts labels to linenumbers.

A variable, like in Level II BASIC, must begin with a letter. It may be up to 15 characters in length, but it must have at least 3 — the last of which must be one of the type-specifier characters: !, #, %, or \$. It is these type-specifiers that tell TBA it is working with a variable. The program will convert these to the standard two-character variable names that BASIC expects and will retain the type-specifier character. For the new user, it will be difficult at first to deal with the concept of local and global variables. A local

Listing 1—Basic Source Code

```
3 CLS
4 LINEINPUT "Enter the SOURCE file : ";FS$
5 LINEINPUT "Enter DESTINATION file : ";FT$
6 PRINT "Copying file ";FS$;" to "FT$
7 OPEN "R",1,FS$,1:OPEN "R",2,FT$,1
8 FIELD 1,1 AS BU$:FIELD 2,1 AS BV$
9 FOR INX = 1 TO LOF(1)
10 GET 1,INX
11 LSET BV$ = BU$
12 PRINT@512,INX;
13 PUT 2,INX
14 NEXT INX
15 PRINT "FILE COPIED"
16 CLOSE
17 END
```

Listing 2—After Conversion by TBA

```
=FSPEC$,BUFFER1$,BUFFER2$,FSPEC2$,INDEX%
@FILECOPY
CLS
LINEINPUT "Enter the SOURCE file : ";FSPEC$
LINEINPUT "Enter DESTINATION file : ";FSPEC2$
PRINT "Copying file ";FSPEC$;" to "FSPEC2$
OPEN "R",1,FSPEC$,1:OPEN "R",2,FSPEC2$,1
FIELD 1,1 AS BUFFER1$:FIELD 2,1 AS BUFFER2$
FOR INDEX% = 1 TO LOF(1)
  GET 1,INDEX%
  LSET BUFFER2$ = BUFFER1$
  PRINT@512,INDEX%;
  PUT 2,INDEX%
NEXT INDEX%
PRINT "FILE COPIED"
CLOSE
END
```

variable is one that is used in a subroutine and is known only by that routine. For example, you may have a TEMP\$ located in several subroutines, and it will be translated to a distinct variable in each one of them. A global variable will be used throughout the program and will have the same name wherever it is encountered. All variables, whether local or global, must be declared before they are used. This is a discipline that should be learned by anyone used to programming in unstructured BASIC, but it is work to get used to it. If you ever intend to learn another language, you'll more than likely have to learn this concept. If you already program in another language, it will be nice to be able to use the structured techniques you've grown accustomed to.

After the source code is prepared (see Listing 1 for an example of TBA source code and Listing 2 for an example of what it translates into), it is saved onto disk as an ASCII file, and TBA is run. First, it will ask you for a source filename and use a default extension of /TBA if none is given. Next, it asks for the destination filename and uses a default extension of /BAS. In either case, if a

slash is appended to the end of the filespec with no extension following, none will be added. I'd like to see ALL application programs assign their own logical default extensions this way. The system calls to do this have been in TRSDOS since day one, and I can't see why more programmers haven't taken advantage of them.

Next, the program asks you for processing parameters. This allows you to specify where the listing output is to go, whether lower/upercase conversion is to be made, whether unquoted spaces are to be deleted from the object program, and what type of cross-reference listing is to be produced. There are many possible answers to this prompt, but the defaults are obtained by simply pressing enter. This causes the listing of both source and object code to the screen, followed by a cross-reference listing to the screen. The cross reference listing contains the labels you've used and the line numbers that were assigned to them. It also tells you what each variable you have used has been translated into.

The next (and final) question before processing is, "Directives:". Usually, enter will be pressed here also, but many

decisions may be made during processing by providing the proper directive and testing it in your program. If you've used EDAS or assemblers on large computers, you'll be familiar with this concept. You may, for example, control which portions of your TBA source code will be translated, based on whether you're producing a program to run with a Model I or Model III. You may also page and title the listing output by using the TITLE and PAGE directives in your program. TBA knows these directives in source code from ordinary BASIC statements by the prefix of an asterisk as "*IF expression" or "*PRLINES". This allows a flexibility previously unavailable to the BASIC programmer.

After these questions are answered, TBA translates your program in six (that's right, six) passes. Pass one strips linenumbers off if you've used BASIC's editor and adds its own. During this pass, labels are also processed and converted into linenumbers. Pass two scans for local variables and translates them into unique, two-character variables that the interpreter will accept. The type-specifier character is retained,

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which makes DEFINT, DEFSTR, and DEFDBL unnecessary. Usually, the first two characters you've used will be retained unless this would result in multiply-defined variables or illegal character combinations. Passes three and four do the same, but with variables that have been defined globally. Pass five changes label references to line number references. In pass six, the source and object listings and cross-references are produced.

Now, you might think that with all this processing, TBA would be slow. Nothing could be further from the truth! The sample listings were translated in about 30 seconds. Even though I have a 3.5 MHz clock, there is sufficient disk I/O that I'm sure a normal-speed TRS-80 would take less than 45 seconds. Longer programs do not seem to take proportionally longer. The longest program I have processed so far has been about 200 lines in BASIC program text after processing, and the time was slightly over a minute! That's fast.

TBA processes the two different types of REM statements differently. If the word REM is used at the first of a line, the entire line will be sent to the object file

unchanged. REM may be used only at the start of a line and will cause trouble if used elsewhere. If the apostrophe abbreviation is used, the line will be ignored entirely during the compile phase and will not appear in the processed code. The apostrophe may be used anywhere in a line.

The documentation provided with TBA is almost a masterpiece. Almost, because I would have organized it slightly differently. But I find no fault with the way they did it. It is well-written, to the point, and lucid. It is liberally laced with examples and the more important examples are supplied on the disk, already typed in for you. There's even a program that will add linenumbers to these test files if you don't use LSCRIPT or LED and prefer to use the BASIC editor. That's thoughtful. You should have no trouble understanding this manual.

Its binding is stiff and doesn't lie flat when being used. I would prefer the loose-leaf format. It is a nice looking booklet about 8½ by 11 inches, and it's three-hole punched in case you would like to place it into a notebook. The index, although not extremely comprehensive, is more than

adequate.

When using TBA, you'll have to realize that spaces can be important. If, for example, you type in the following line, (with no spaces) @LABEL:FORINDEX%=1TO100:NEXTINDEX%, TBA will think that FORINDEX% is a variable and that NEXTINDEX% is another distinct variable. This code will be incorrectly written and the object program will bomb. The line should be written with spaces after the FOR and the NEXT in order to be translated properly. The =1TO100: will be passed unchanged.

New users may feel that TBA is somewhat restrictive. That's true, but it teaches good programming practice and it is not all that hard to get used to. If you're thinking about learning assembly language programming, the label concept and structured programming techniques are an absolute must. Because of this, TBA could even be used as a learning tool for those intending to learn machine language at a later time.

If you'd like to program in structured code, but like the portability and ease of BASIC, then TBA is a "must have" addition to your software library. It is

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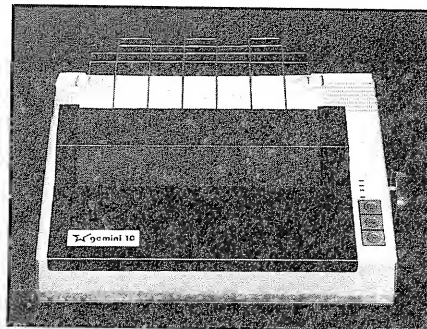
The printer has four indicator lamps and three switches located on the right-hand side of the top surface. The switches are on-line, form feed and line feed. The indicators are for power, ready, on-line and paper out. The main power switch is located on the right side panel toward the rear. There is also a large knob for manually advancing the paper on the right side. The rear panel contains the power cord, the standard Centronics-type connector, and four small DIP switches for setting certain options.

A smoke-colored dust cover protects the print head and drive mechanisms. The removable tractor feed insures an even and sure paper alignment and is fully adjustable for normal 9" pin-feed paper, or narrow mailing labels. There is also the normal friction feed for utilizing normal bond paper or other materials not having the pin feed holes. The paper loads quite easily and the metal paper guide and paper separator work quite efficiently. The unit also comes with a roll paper holder for use with rolls of paper, for economy printing applications. The printer weighs 15.4 pounds (7 kg) in the 10-inch version and 22 pounds (10 kg) in the 15-inch version. The overall impression is that these printers are built very solidly.

The specifications are as follow: The print head uses 9 wires, is user-replaceable, and has a mean characters between failure (MCBF) of 10×10^7

characters. Print speed is 100 CPS at 10 CPI, and the printer is bidirectional and logic seeking. The normal character matrix is 9x9 with true descenders, 18x9 in emphasized mode, 18x18 in double strike, 6x6 for block graphics, 60x72 for low-res bit-image graphics, and 120x144 for high-res bit-image graphics. The unit has the standard 96 ASCII characters, 96 italic characters, 64 special characters, 32 block graphic characters, and optionally a 96 proportional ASCII character set and 32 proportional special characters. The available fonts are normal (10 CPI), elite (12 CPI), condensed (17 CPI), emphasized, double-strike, three enlarged fonts (5, 6, 8.5 CPI), italics and super/subscripts.

Gemini-10



Special features include self-test, continuous underline, backspace, vertical and horizontal programmable tabs, left and right margin set, seven- or eight-bit selectable interface, bit-image column scan, and perforation skip. Line spacing is 1/6, 1/8, 7/72, and a programmable n/144 inches. The Gemini-10 will handle paper from three to ten inches wide, up to three sheets, and the Gemini-15 will handle a width of five to fifteen and one-half inches with three sheets. The standard interface is a Centronics parallel type, with an optional RS-232C/20 Ma current loop serial interface. The printer uses a standard Underwood spool-type ribbon, making ribbon replacement inexpensive and easily obtainable. The overall MCBF, excluding the print head, is 5×10^7 characters.

The printer was tested on a Model I computer using the Newsprint word processor, as well as several other programs that give a printed output. We contacted Chuck Tesler at Prosoft to find out if our Gemini, equipped with the optional proportional character set, could produce text that was proportionally-spaced and right-justified. His reply was that the printer was incapable of doing this and that several users of Newsprint had

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complained that his software would not drive their new Gemini. We contacted Star Micronics about the problem and were told that the printer could produce proportional characters, but could not have them right-justified. Keep this in mind if you are considering the proportional option. One other option is a custom 9x9 character set that Star Micronics will produce for users with special applications.

The printer has performed flawlessly for about three months and has been a real workhorse. The tractor feed mechanism seems to be well designed and we have not experienced a paper jam as yet. The built-in buffer is handy and would be more so with the addition of the optional extra 4K RAM. The character set seems to be identical to the Epson based on some of our tests. We used the Epson driver in Newsprint to produce some printed output on the Gemini, and it appeared to work well. The high-resolution graphics appear to be another story. We attempted to produce hard copy on our Gemini using the Powerdot program and obtained erratic results. Apparently, some of the control codes are different in the Gemini. This situation will probably change in the future as more people purchase the Gemini, and the authors of the graphic software drivers accommodate the new printers. The manual, which is outstanding in context and clarity, has some sample programs that produce the graphics and

they are really nice. The Gemini is a real bargain and should sell well. We would recommend the added 4K buffer over the proportional character set as options.

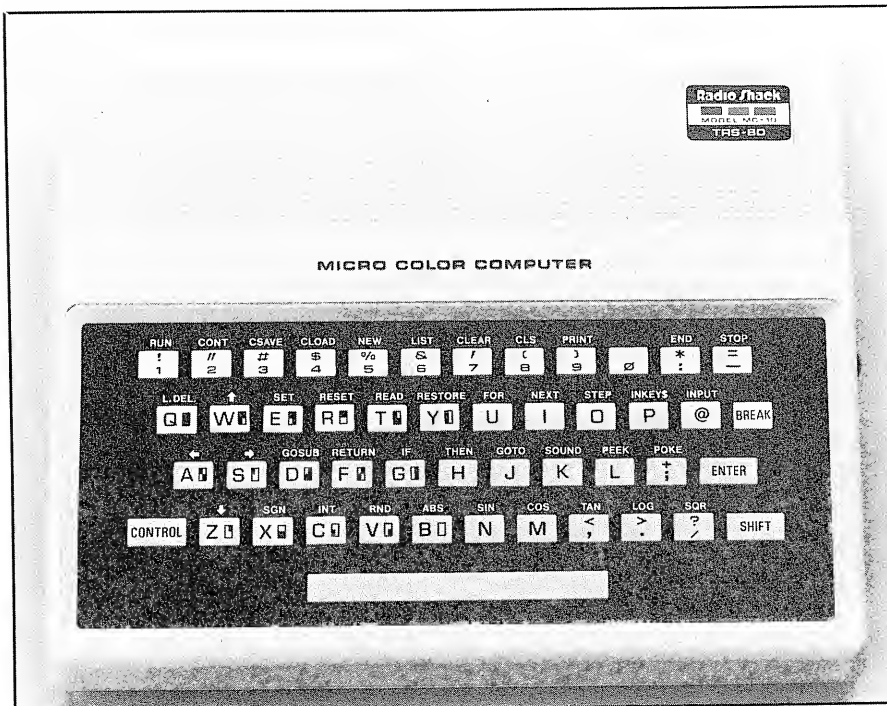
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of graphics characters. A couple of drawbacks are worth mentioning here. There is only one shift key on the right side of the keyboard. The one ordinarily found on the left side of a standard keyboard was replaced with the control key. Also, the spacebar is tucked neatly out of the way. It's almost impossible to depress using the familiar thumb-on-spacebar technique!

The MC-10 is expandable to 20K of RAM for an additional \$49.95. The basic machine contains only 4K, but actual memory available on power-up is only 3142 bytes. The additional RAM can be plugged into a memory expansion port at the rear of the keyboard, much like that of the Timex/Sinclair. I tried to obtain the extra memory for this review, but the local Radio Shack stores didn't have it in stock and they weren't able to give me a delivery date.

MC stands for Micro Color, and micro color it is. The entire instruction set is only a subset of that in the Color Computer. There are many powerful commands, such as PEEK and POKE, SET and RESET; MID\$, RIGHT\$ and LEFT\$ for string handling, etc.; but you'll find no high-resolution graphics commands. The MC-10 does not have high-resolution color graphics capability.

The MC-10 contains a 6803 microprocessor which is an earlier version of MPU in the 6800 series of microprocessors available from Motorola. Currently, there isn't much software available for this machine. There has been quite a bit of software written for the 6800 series of microprocessors, but most of it is in machine language. You won't be able to use any of it, however, because the version of BASIC (Micro Color BASIC by Microsoft) doesn't allow you to load or save machine language programs. It looks like serious programming for the MC-10 is out of the question.

Machine language programs can be written in BASIC using line packing, string packing, or dumped into the form of DATA statements, but the manual does not provide a memory map or other necessary technical material. It looks like the hackers may have some fun with this machine.

The MC-10 contains no joystick ports, so serious gaming is out of the question. There's no expansion port except for the one for memory. After-market people may be able to use it for future add-on capability. You won't be able to make use of Color Computer program cartridges since there's no slot provided for them.

The MC-10 does have an RS-232 serial port which will enable you to use a number of serial printers, plotter/printers, or plotters. Radio Shack claims

that telecommunication is possible with the correct terminal program installed. You should be able to easily connect a modem to the system, but how does one install a terminal program? These must be written in machine language for reliable communication at speeds over 110 baud, but, as mentioned earlier, there's no command which will allow you to load a machine language program!

Programs may be saved using most standard cassette recorders, but programs saved using the TRS-80 Color Computer are not readable by the MC-10. Programs written for the TRS-80 Color Computer may be compatible but, more than likely, you'll have to perform your own conversions and type them in.

One annoying short-coming of the MC-10 is that you must manually control the cassette recorder during cassette I/O operations (CSAVES and CLOADS). The CSAVE and CLOAD commands do not turn the cassette recorder off and on automatically. At first, I took this to be a flaw with the machine, but discovered later that this feature was simply left out. It appears that the lack of automated, software controlled, cassette I/O is going to present some problems when writing programs that require successive, cassette read/write operations.

The operator's manual is very well written and will get you up and running in very short order. There are many programming illustrations that demonstrate use of each command that is available with the MC-10. It will be beneficial for the first-time user.

The MC-10 seems to be directed toward individuals who are entering the micro-computer arena for the first time. You can use the machine to learn elementary programming techniques and familiarize yourself with some of the hardware. But the lack of expansion capability makes your education incomplete. In the event you decide that computing isn't your forte, you will not have invested a large sum of money for the experience. At \$119.95, the MC-10 is overpriced, and I expect to see the price drop dramatically in the near future, especially in light of the recent \$39.95 price tag on the Timex/Sinclair at some department stores.

Don Scarberry

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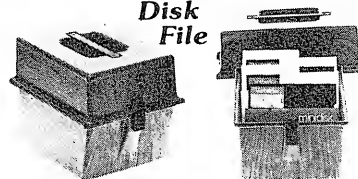
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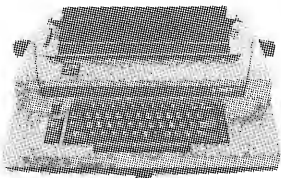
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Reviews

If you're like me, you initially bought a TRS-80 cassette-based system (in my case, a Model III) because you couldn't afford a disk system at the time. Then, you gradually started buying software on tape: arcade games, utilities, word processors, and so on. Along the way, you couldn't help but notice how much more software (electronic spreadsheets such as VisiCalc, word processing programs with proportional spacing and special print codes and controls, etc.) was available if you had disk drives. Eventually, this led you to upgrade. But what about all the tapes you bought before the changeover?

For BASIC programs, no problem. You just CLOAD and then SAVE the programs to disk. But most of your programs, due to the relative slowness of BASIC, are probably written in machine language. These system programs, moreover, most often use memory addresses which overlap with TRSDOS. Attempts at executing such programs from disk result in a "crash" in which, at best, TRSDOS reboots itself. What a pity to have a disk system and not be able to use it with all those taped programs!

Enter CRB Microtools, with its utilities designed to handle precisely such problems as this one. You simply load TRSDUM in the manner of any other system program. You are given a menu. Selecting the key that loads a tape into RAM, you press the key to offset addresses upon the return to the menu. This may be done automatically, or you may stipulate where you want the addresses to begin. According to the manual, the automatic default works in 99% of the cases.

There are operating systems such as Newdos which do contain an offset utility (called LMOFFSET), but frankly, I had no wish to spend over \$100 and also learn a new (and reportedly, huge) operating system, having barely explored TRSDOS. So, when I saw the magazine ad, I gave the author a call. I found him very helpful and willing to explain his utility, after which I ordered and received it promptly. The first thing that I did was to make a working copy of TRSDUM (actually called TRSDUM3/CMD, the version appropriate for the disk-based Model III). I proceeded to use that to copy my cassette Scripts 1.0.

What a pleasure to be able to write a letter without having to use tape! But that was just the beginning. Next came my collection of arcade games from Adventure International, Big Five, Soft Sector Marketing and others. This utility for offsetting memory addresses alone is certainly worth the asking price. I would have been willing to pay more.

There are other features, such as ones that display the length of any file, make high-speed tape archives of your disks, key select baud rate, unoffset any load offset, and others. The tape versions for the Models I and III are respectively called TRSTUM1 and TRSTUM3. The disk versions are called TRSDUM1 and TRSDUM3.

The manual is well written, clear, and free of sloppy spelling and grammar. The utility is quite easy to use. At this price, this program is a super value and a real winner.

Dr. Michael W. Ecker

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It is attractively packaged in a black, satin-finish metal case. It measures 8¾ × 11½ × 1¼ inches and weighs a mere four pounds. It has a sleek, low-profile look to it. Eight L.E.D. status indicators and six rocker switches are included on the front panel. The power supply is externally housed in an AC/DC module that plugs into a three-prong 117-volt AC wall outlet. It supplies power to the unit via a keyed connector that mates to a connector on the back of the unit. The phone line cable and the standard RS-232 jack for connection to the data terminal equipment are also included in the rear of the unit. The telephone connection cable is 7 feet long and terminates with a modular phone plug.

The unit was quite easy to operate and required very little in the way of setup. The RS-232 cable from the TRS-80 is plugged into the rear RS-232 jack and the telephone cable is plugged into the supplied adapter in order to plug two devices into one phone connection. The modem may be operated with or without a telephone attached. It has the ability to dial the telephone number while under software control. The power supply is attached to the Molex connector in the rear and then plugged into a standard

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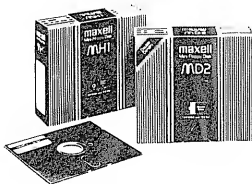
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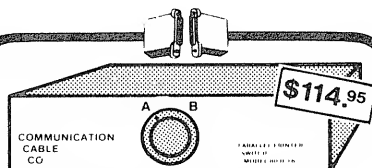
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wall outlet. The terminal program is then loaded, whereby the TR indicator lights up, signaling terminal ready.

The modem speed is next selected by the position of the switch marked "HS" for high speed. The phone number is entered by telling the modem that you wish to dial by entering two line feed-carriage return pairs in a row. The modem responds with a message on the screen asking, "DIAL: WHAT NUMBER? . . ." The number is entered, for example: 9:8029435567 (carriage return). The ":" indicates a dialing pause to allow dialing through a PBX system. As soon as the carriage return is sent, the modem responds with "DIALING," then pauses for two seconds to allow the local central office to return a dial tone. After this, it begins to pulse dial each digit with each one displayed on the screen.

After the entire number has been dialed, the modem sends a "DIALING DONE, WAITING FOR ANSWER TONE." When the modem link is established, it sends "MODEM ANSWER TONE, RECEIVED DATA MODE." If, after 17 seconds, the called modem does not answer, the call sequence is disconnected and the modem sends "NO MODEM ANSWER TONE RECEIVED, TRY AGAIN." To redial, simply enter two carriage returns, and then a third when the prompt appears. To abort dialing, simply enter two carriage returns and the letter "Q." It will respond with the word "BYE." Pretty smart little guy, huh?

The Cermetek is bilingual, meaning it will speak two languages. The first is the Bell 103/113 standard at 300 baud, and the second is the Bell 212A standard at 1200 baud. It has the ability to automatically sense which type of data is being received while in the auto-answer

mode. If the HS switch is set to high speed, the modem will shift down to 300 baud if the carrier tone detected is at 300 baud. This gives tremendous flexibility for an application such as a 300/1200 baud bulletin board, where the majority of callers will be using the slower speed, but those having 1200 capability can also be accommodated.

In addition to the front panel switches, there are also 23 other options that are DIP switch selectable inside the unit, making the 212A very flexible. The front panel switches, besides the HS switch, are: AL (analog loopback), which connects output of transmitter to input of receiver; DL (digital loopback), connects output of receiver to input of transmitter; ST (self-test), connects internal generator for self-testing; RDL (remote digital loopback), commands remote modem to assume digital loop test mode; DATA (voice to data), commands the modem to enter the data mode. You'll notice the lack of a power switch, a minor irritation. The indicator lamps are MB (make busy), TR (terminal ready), MR (modem ready), SD (send data), RD (receive data), H (high speed), MC (modem check), and TM (test mode).

The modem was tested on two local mainframe computers. The unit worked without a single dropout over several days of testing. The increase in speed at 1200 baud was tremendous. Instead of a line taking several seconds to display, it is almost instantaneous. The pulse dialer worked well under all conditions and the entire unit performed very reliably. The documentation was excellent and the total impression was very favorable. The Cermetek 212A is certainly to be considered if one is contemplating a move to 1200 baud.

Jim Klaproth

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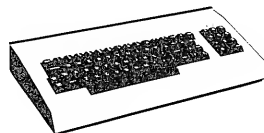
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\$149.95**

This accounts receivable program has been in use here at 80-NW Publishing, Inc. for over ten months. The program is written in BASIC and runs under TRSDOS. It is a large-capacity system that will let you expand your information over, if needed, 31 data disks. Thousands of account numbers are possible and you can have up to 99 sub-accounts to a master account. The system also gives different options for interest rates, customer status codes, transaction codes and more.

I was amazed by the number of different possibilities it offered. All this is backed up by thorough documentation. The manual has 26 pages plus sample printouts and is written more like a learning manual than an operator's manual. It will lead you step-by-step through the entire monthly cycle. For later references there is a very detailed table of contents. I found it very easy to understand and no questions went unanswered.

You may print out an audit report before posting and get reports with percentage of credit limit, date of last payment, sales analysis, 30-60-90 day aged statements with date, invoice number and description. My only objection is that there is no sorting of accounts and it is difficult to locate information if you do not have the account number. A separate utility that would alphabetically sort all the accounts would be extremely helpful.

The program is easy to operate and

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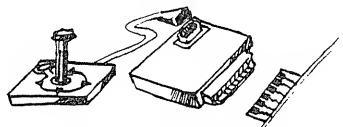
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Reviews

runs smoothly. It is a stand-alone program and is not interactive with other accounting routines. There have been no problems and that is quite amazing since I managed to destroy several other A/R programs before discovering this one. I have tried to find flaws by pressing the wrong keys, inserting the wrong disk, entering information for non-existing accounts, and so on. The list of my mistakes is endless, but so far the system has caught all of them and told me "You can't do that!"

I believe in this program and find it to be excellent. Comparing the cost to other A/R programs makes it even more attractive. We recently received the General Ledger program from Holman D-P Services and I can't wait to try it out.

Helen Dalton

**Midway Campaign
Model I/III
Avalon Hill Game Co.
4517 Harford Rd.
Baltimore, MD 21214
(301) 254-9200
\$16 tape, \$21 diskette**

On June 4, 1942, the Japanese Imperial Navy launched an attack against the tiny Midway Island chain in the Pacific. The attack had several goals, but its primary purpose was to lure the battered remnants of the U.S. fleet out of Pearl Harbor for a fight to the finish. The American aircraft carriers, the heart of the fleet's strength, had escaped destruction in the surprise attack on Pearl Harbor. For all practical purposes, those carriers were all that stood in the way of Japan's total domination of the Pacific.

Midway was a base the United States had to hold onto. Only 1100 miles from Pearl Harbor, its loss would cripple the American defense perimeter. The Japanese assembled a force of 190 ships in 16 groups to seize Midway and launch diversionary attacks. That force consisted of 8 carriers, 23 cruisers, 65 destroyers, and numerous auxiliary craft. Against it, the Americans sent almost all of their forces: 3 carriers, 8 cruisers, and 14 destroyers. That pitiful force seemed hopelessly outnumbered, but the Americans had broken the Japanese radio code. They had the full plan of the assault days in advance. Thus, on June 4, unknown to the Japanese, the U.S. fleet was already lying in wait northeast of Midway, looking for the opportunity to ambush the pride of Imperial Japan.

This is the historical background behind Midway Campaign, produced by Avalon Hill. You are in command of the American forces, while the computer controls the Japanese fleet. Your forces

are broken up into three groups: Task Force 16 (carriers *Enterprise* and *Hornet*), Task Force 17 (carrier *Yorktown*), and Midway Island itself. The island possesses an airstrip and a small group of airplanes. Midway can be thought of as an "unsinkable" carrier.

The battle takes place on a map that consists of a 12 x 12 array of dots. The distance between each dot is 100 nautical miles. The ships of each side move at 25 knots, with the exception of the Japanese transport force, which travels at 18 knots.

As the game commences, it is high noon on June 3, the day before the battle. Only your task forces and Midway are displayed on the map. The Japanese forces will not be displayed until they are spotted by patrol planes operating from Midway. At the same time that you are searching for the Japanese, they will be conducting searches for any American vessels near Midway. The actual discovery of each other's ships is a random event over which you have no control. The actual battle involved a great deal of groping by the two sides. You may or may not be informed if the Japanese have spotted your ships.

Your task forces are initially located to the northeast of Midway. The Japanese carrier force will approach Midway from the north and west. Two other Japanese forces will approach Midway during the course of the game: a cruiser force and a transport force. You may not immediately know which force is which, even after they are located. However, the cruiser and transport forces generally approach Midway from the west and south.

You have numerous commands with which to conduct your battle operations and they are broken down into two groups: fleet commands and air commands. After selecting numerous settings, a strike is launched.

All you can do now is sit back for the printed results of the strike. Part of your air strike, or all of it, may miss the target, an event that was all too common during the actual battle. The computer will inform you of how many hits and near-misses you score against the Japanese. The amount of damage inflicted is doubled if the target has planes preparing to take off.

This game presents some very interesting problems. The Japanese planes have greater range than yours. If they spot your ships first, they may be able to pound you before you can even get a strike armed, let alone launched. No night carrier operations are possible, so you may have to break off a successful attack as the sun sets. Also, the opposing forces lose track of each other at night, so new searches have to begin at dawn.

This may give the Japanese the opportunity to strike you unaware. The Japanese fleet will attack your carriers before Midway, assuming that all three are in range. Thus, you may wish to keep your carriers at a respectful distance from Midway until such time as the Japanese reveal themselves. Of course, this generally means that Midway will be knocked out of action, but Midway is of only secondary interest in this game. The only real targets are the carriers of each side.

The game ends when either all your carrier forces (and Midway) are destroyed, when the Japanese carriers are destroyed, or when either side flees the scene of battle. The Japanese will flee if all of their carriers are too heavily damaged to launch air strikes.

This game can be very absorbing, especially if you have any interest at all in the actual battle, which was the turning point of the Pacific war. The four-page instruction manual is clear and presents a short historical backdrop. However, my copy was flawed by some misplaced sentences, an amazing typo that should have been easily caught. The game is attractively boxed for storage. Although written in BASIC, the program does not run slowly.

There are a few problems. The TRS-80 program is one of four supplied on the game tape. Also supplied are versions for the Apple, Pet, and Atari computers. The TRS-80 program is the second one on side two of the tape, so you have to search for the break in programs by ear before you can load it. You should immediately copy the program onto another tape to avoid future inconvenience.

Aside from the battle map, there are no graphics associated with this program, nor are there any sound effects. The addition of either would have greatly enhanced the enjoyment of this program. It can get tiresome watching 61 planes bombing Midway, with the resulting hits and near misses being printed silently on the screen.

The cruiser and transport forces take no real part in the battle, aside from being very easy targets. They're too easily identified to be good decoys, and they present no danger to your forces. The cruiser force and your carriers can be only a few miles apart, but your carriers are never touched. That's hardly realistic.

Overall, I recommend Midway Campaign as an interesting tactical game. You are faced with the same frustration as the American commanders: you can only win by surprising the Japanese when they are most vulnerable. But, too often, the surprise may be on you.

Dan Cataldo

Bulletin board

This bulletin board space is available free to individuals with single or unusual items for sale or trade. Basic Computing reserves the right to reject any commercial advertising in this section and suggests using our display advertising for that purpose.

These notices are free of charge and will be printed one time only on a space available basis. Notices will be accepted from individuals or bona fide computer user clubs only. All these unclassified announcements must be typed, contain 75 words or less and include complete name and address information.

Need an efficient work station for your hardware? Include your printer, up to six program binders, a diskette drawer, and more in only five feet and a space as narrow as 24 inches. Compact but not crowded. Do it yourself for less than \$60, plus finishing. For complete plans, send \$5 to C. L. Day, 7353 Wild Haven Park, Lambertville, MI 48144.

Overseas Club called 1001 Bytes would like to correspond with user groups stateside. We have 97 members and active individual user groups of Atari,

TRS-80, Apple, Osborne, IBM PC, Kaypro, HP, Sinclair, and others not so active. Many have modems. Knowledge ranges from zero to expert. Eight thousand miles from home seems so far! Contact us through the current president W. R. Cummings (CC 956), Saudia Airlines, P.O. Box 167, Jeddah, Saudia Arabia.

Help! I am looking for repair service on my Selectra-Print. Call Jim Mahoney (209) 478-8863.

8-inch Flippies for only \$1. I have thousands of eight-inch (3M 340/2-0) flippies for use in the Model II/12/16 or other computer equipped with eight-inch drives. They can be written to on both sides, thus doubling your storage capacity. Packages of ten for \$10, plus \$2 for shipping and handling. Write D. B. Shaw, 939 Ave Palos Verdes, Palm Springs, CA 92262 or call (619) 340-5881.

For sale: Model I with 32K (Holmes internal board), lowercase. \$350 plus shipping, or best offer. Also, Epson board so Model I has fully functional MX-80 for \$50 including cable. Doug Miller, 516

Maxine Dr., Oxford, OH 45056 or call (513) 523-3936.

Electric Pencil 2.0 word processing software for the Model I/III. Original disk and documentation and only one is available. \$50 postage paid. Ed Weber, 361 North 25th St., Louisville, KY 40212 or call (502) 774-8347.

Mint Condition Model I, 48K, two drives, with RS-232 and manuals for \$1000. J.P. Evans, 13666 S. Hawthorne Blvd. #5, Hawthorne, CA 90250 or call (213) 644-1135.

Dallas-Ft. Worth User Groups: There are now four TRS-80 user groups meeting in the Dallas-Ft. Worth area. Mid-Cities TRS-80 Users Group meets 2nd and 4th Tuesdays, 7 PM, UTA-Arlington, Davis Hall, Rm B87, 800 So. Cooper and West Division, 637-4510. DALTRUG TRS-80 Users Group meets 2nd Saturday, 10 AM, UTD-Richardson, Jonnson Hall, 2601 N. Floyd Rd and Campbell Rd., 370-2432. Ft. Worth TRS-80 Users Group meets on every 3rd Wednesday, 7 PM, at FRI Electronics, 3006 SE Loop 820 at Wichita St., 429-7055.

TriSoft has CP/M-68K for the TRS-80 Model 16 And It's Available Today!

TriSoft introduces the CP/M-68K operating system for the Radio Shack Model-16 and Model-II Enhanced computers. This addition to the CP/M family adds the speed and power of the 16/32-bit MC68000 under CP/M-68K while maintaining compatibility with the vast library of CP/M 2.2 software.

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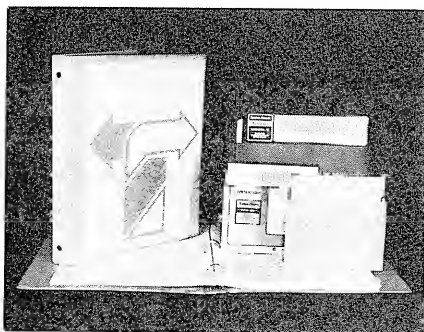
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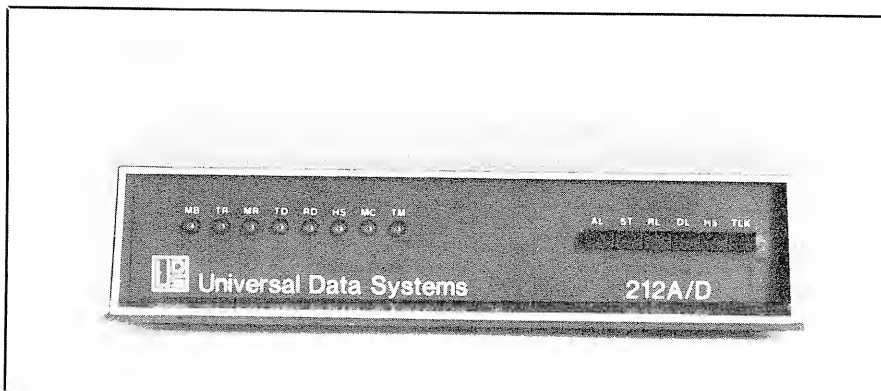
Model 100 Software

Typing Teacher, originally offered by Instant Software for the Models I/III is now available for the Model 100. It is a seven-part package which takes a novice to complete keyboard mastery. On screen diagrams show correct placement for fingers to master proper techniques. It sells for \$17.95 and requires 8K of memory. Contact Instant Software, Rte. 101 & Elm

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Market Master: Dual Moving Average is one of a series of program from Management Services for the Models I/III. Users can fully test a stock or commodity trading method without risking any money. Trading systems can be refined and improved. Daily buy/sell recommendations, graphs, reference sheets and more are produced. The program determines buy and sell points according to the crossing of two moving averages. You can select any length of time or have the computer search for the most favorable ones to use. Price is under \$125 and for more information contact Management Services, 2901 Clendenen Lane, Longview, TX 75601 or call (214) 753-1850.

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The UDS 212AD is a fully-

functional auto dialing, auto answer 0-300 or 1200 baud modem from Universal Data Systems. The unit has an automatic calling unit that allows the calling of up to five, preset, 30-digit numbers. The built-in operating directory can be displayed anytime as well as its built-in test functions. Most operations can be invoked with a single keystroke. The unit currently sells for \$795 and allows for asynchronous or synchronous operation. Contact Universal Data Systems, 5000 Bradford Drive, Huntsville, AL 35805 or call (205) 837-8100 for more information.

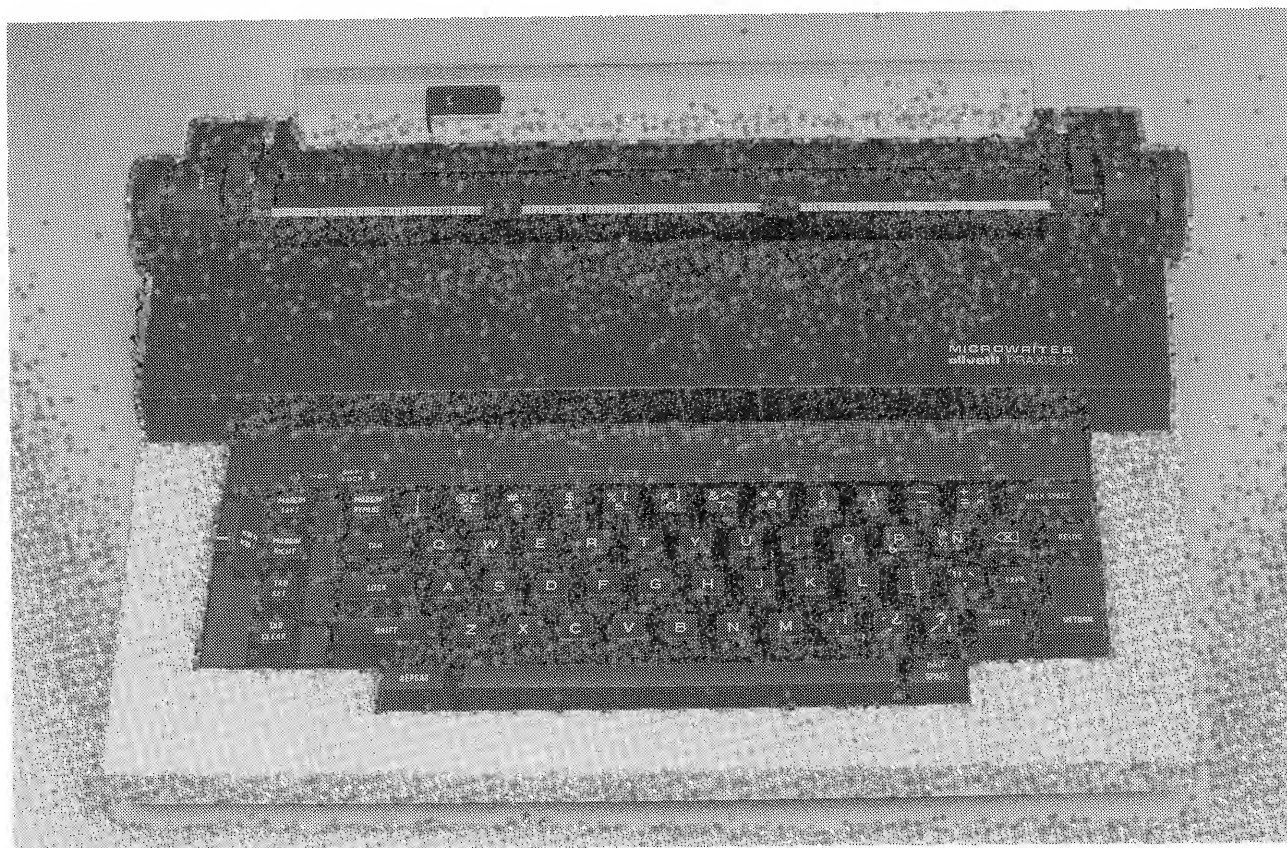
Help for Profile III Plus

Crest Software offers over 75 helper sheets that can be added to your Profile III Plus manual. Included are two 17 X 22 inch wall charts showing program flow, why's and commands to use. A host of examples and tips on data layout help the user understand and utilize the program. The inserts and wall charts are shipped prepaid for \$12, or purchase the wall charts separately for \$2 prepaid. Contact Crest Software, 2132 Crestview Dr., Durango, CO 81301 or call (303) 247-9518.

Oasis Operating System

Caravan is a new communications system designed for members of the Oasis Users Group. The board, located in Santa Barbara, CA, is operated 24 hours a day at 300 baud and their number is (805) 965-5415. There are plans to add 1200 baud

Ammicro introduces the first letter quality printer for \$680 that can also be used as a typewriter.



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It's not just printer or a typewriter that comes complete with a deluxe carrying case, but a feature-packed, lightweight machine that doubles as an office typewriter. This printer is a simple, low cost, reliable unit which can be utilized with word processing systems, microcomputers, personal computers, and small business systems. The Microwriter's low noise level and slim modern styling allow it to blend with any decor.

The Microwriter's print quality is identical to the finest office typewriters on the market. This machine is not only perfect for letters and manuscripts, but with its 165 character, 12 inch print width, the machine is perfect for letter quality budget spread sheets, price lists, data sheets, and forms.

The Microwriter can tab, rule single lines both vertical and horizontally, underline and print at 10, 12, or 15 characters per inch (switch selectable)! Its ten character memory for automatic error correction, lift off correction ribbon, and fixed or programmable page formats are a few of the many features that make it a perfect office typewriter. Microwriter not only handles letter and legal size sheet paper in widths up to 12 inches wide, but also handles fanfold paper.

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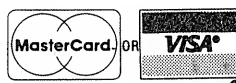
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The Oasis Users Group, OUG, the sponsor of the board, now has about 500 members and their library contains over 1200 files of utilities, tutorials, applications, games and more for the Oasis user. Most members are computer professionals and about 15 percent are users from other professions (doctors, lawyers, CPA's, etc.). Currently, the operating system has been implemented on the TRS-80 Models II, 12, and 16. Membership in the club is \$35 per year. Send complete information about your equipment, software, and possible library contributions to Fred Bellomy, Oasis Users Group, P.O. Box 2400, Santa Barbara, CA 93120 or call (805) 965-0265 for more information. You will receive two 8 inch diskettes containing information about the library, newsletters, and a representative selection of library software.

On Line Flea Market

The flea market is available free to all users, both private and business. Its main purpose is for users to list computer-related items or services they wish to sell or buy. Users open their own accounts and may place ads of up to five lines of 60 characters each, plus a heading. The board is sponsored by Stanford Software Systems of Colorado Springs, CO and service is available 24 hours a day at 300 and 1200 baud. Phone, via modem, (303) 685-1733 or by voice (303) 685-5975.

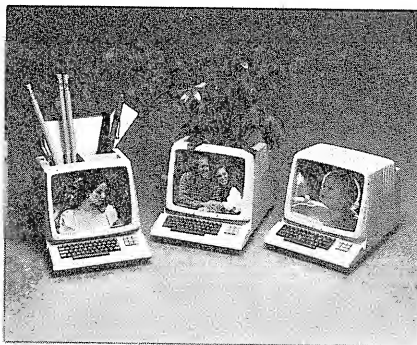
Lazymerge

AlphaBit Communications, Inc. announces a mail merge program for use with their Lazy Writer word processing system. The program, Lazymerge, merges names and other information from the mail list with a text file. It allows for selective printing from the list and users can even select substitute lines of text to be used if information in the mail list is not appropriate for the line of text. For instance, print "Dear Customer" if you have a company name and no person's name in the mail file.

Currently, Lazymerge only works with a mail list kept as a Lazy Writer file or with a list kept with Postman (another AlphaBit Communica-

tions, Inc. program). The program sells for \$44.95 and for more information contact AlphaBit Communications, Inc., 13349 Michigan Ave., Dearborn, MI 48126 or call (313) 581-2896.

Terminal look-alikes



Terminal Look-alikes

The CompuGift line of terminal look-alikes are made of high quality molded plastic, measuring 4 1/2 X 6 X 4 1/4 inches. The Computer Caddy stores pens, pencils, note pads, and there is a version for plants called the Computer Planter, and one for loose change called the Computer Bank. Each has a clear acrylic screen for storing your favorite photo and it comes in four colors, beige, dark grey, yellow and magenta.

It can even be imprinted with your company logo. Gift boxed; \$9.99 each plus \$2.00 shipping. For quantity discounts or imprinting information contact CompuGift, Inc., 27802 Perales Street, Mission Viejo, CA 92692 (714) 768-8223.

Refunders Relief

Kensoft has introduced this program for keeping track and making effective use of refund, coupon and proof of purchase offers. Refunders Relief will work on Model I or III computers with 16K or more RAM. The routine will file all the necessary information on sixty different refund offers and 250 different proofs-of-purchase (POP) requirements. Match form requirements to the available POPs, save effort, time, and take advantage of the tremendous savings possible through product refunds and promotions. Contact

Kensoft, 2102 50th Street, Kenosha, WI 53140 or call (414) 654-2722.

Colorpede

Colorpede is a new arcade quality game from Intracolor Communications. This one or two player game for 16K Color Computers has players attempting to destroy the Colorpede as it slithers through the toadstools. As scores accumulate the action intensifies and more bugs, plants, and toadstools obstruct your progress. This fast action, high resolution, all machine code game uses keyboard or joystick input. Cassette version is \$29.95 and disk version is \$34.95. Add \$1.50 for shipping. Contact Intracolor Communications, P.O. Box 1035, East Lansing, MI 48823 or call (517) 351-8537.

Teleterm

Telexpress, Inc. has released three new versions of Teleterm, a communications software system. Teleterm is an intelligent terminal software package that allows asynchronous communication to virtually any other computer. Features include being able to download and upload files directly disk-to-disk between Teleterm systems (for example, TRS-80 Model II to TRS-80 Model III or TRS-80 to IBM-PC); file transmission directly from disk which eliminates memory buffer limitations; user-definable auto-transmit messages of up to 255 characters; and more.

Two of the new versions are for the Model II/12/16, and a CP/M version for the Model II (\$165). A third version is for the IBM-PC under PC-DOS (\$125). A Model III version is available for \$89.95. Contact Telexpress, Inc., P.O. Box 217, Willingboro, NJ 08046 or call (609) 877-4900.

Program Library System

The Arranger is a fast machine code program for the Models I/III that automates and catalogs your diskette library. It resides on its own diskette where it internally stores the directory for each of your diskettes. Capacity is for up to 250 diskettes with over forty programs on each one. Alphabetize all or part of your library in a few seconds.

Scanning or printing the information is easy. Updates can be done with a single keystroke.

The program is compatible with all popular DOS systems and can be used with one to four disk systems, whether 35, 40, or 80 track. Cost is \$29.95, from Triple-D Software, Box 642, Layton, UT 84041, phone (801) 546-2833.

Video Game Glove

Nancy and Company offers a solution to sweaty palms and blistered thumbs. The Videomax game glove is available in three colors (white, navy blue, and beige), is made of calfskin leather with a non-slip grip, has a netted backing, and velcro fasteners. The glove is available in left and right handed versions and three different sizes (S, M, L). The glove sells for \$6.95 plus \$1.00 shipping (California residents add .45 sales tax). Contact Nancy and Company, 22594 Mission Blvd, Suite 302, Hayward, CA 94541 (415) 582-2246.

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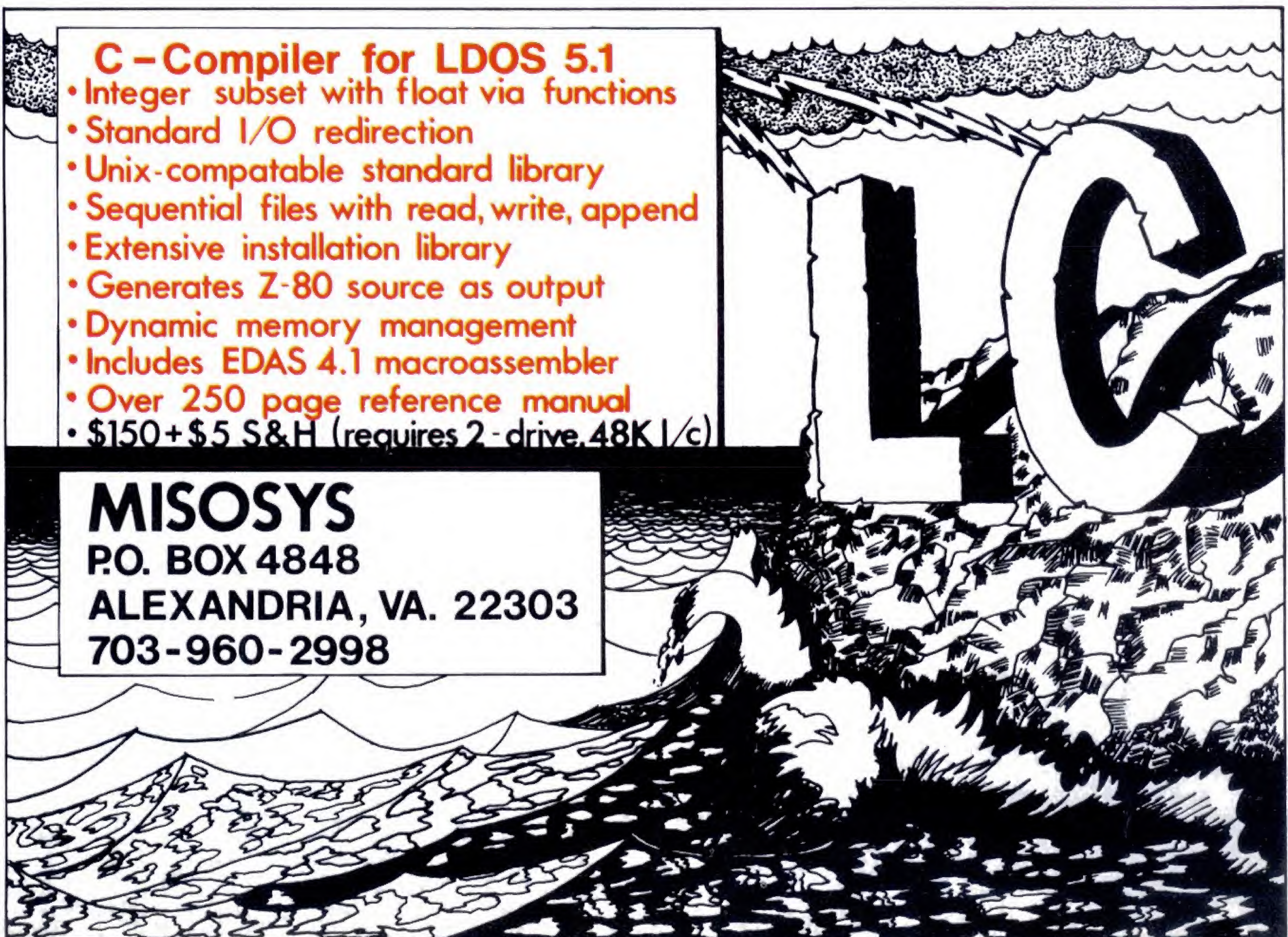
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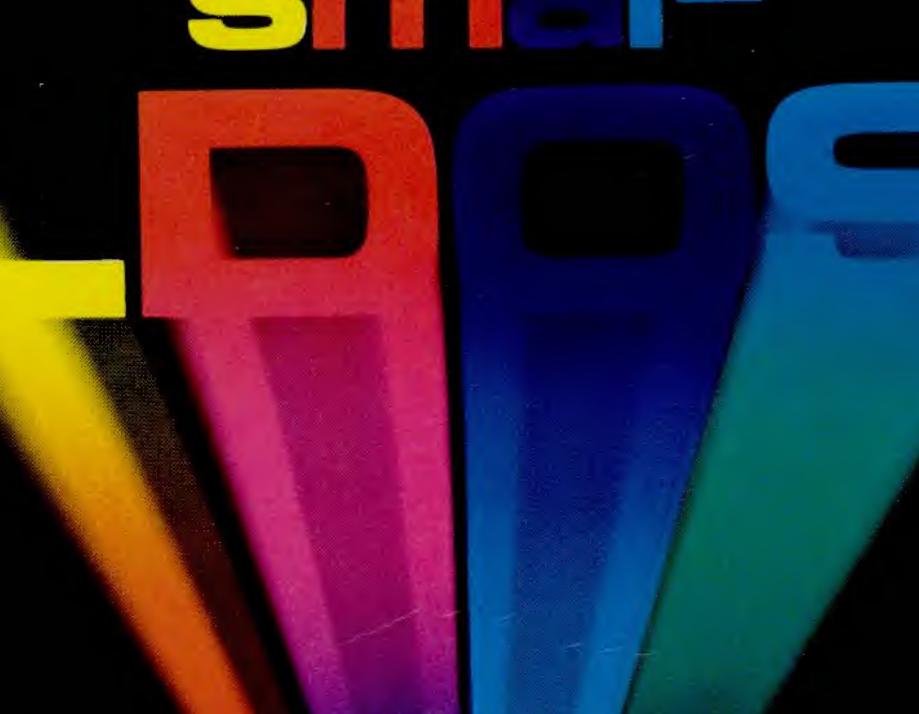


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